# CULTURAL DISTANCE, RELIGION, AND FOREIGN BIAS IN PORTFOLIO INVESTMENT

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## ABSTRACT

The effects of cultural distance and religion on foreign bias in portfolio investment are explored in two chapters. In the first part of this paper, evidence of a previously discovered curvilinear relationship between national culture and national wealth (GDP/capita) and is observed for the first time with aggregate investment data. This research finds GDP/capita to be curvilinear with the cultural distance index, and that this curve changes directions depending on the economic development of nations, the implication of which is that the curvilinear relationship between national culture and national wealth appears much more strikingly for developing markets and should be accounted for in investments research that includes such nations by including additional controls for economic development. In the second part of this paper, theory from culture is used to associate the effects of religion on portfolio allocations. Greater religiosity, or the ratio of the number of religious adherents to the total population, is found to be negatively associated with portfolio allocations for U.S. investment funds. This result follows previous theory and empirical results regarding the risk preferences of religious adherents. In addition, greater gambling preferences, as measured by the ratio of Catholics to Protestants, is associated with higher foreign portfolio allocations for funds. The results for both chapters are obtained with ten years of foreign allocations in 36 different countries from 475 U.S. investment funds.

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# PART 1

## Foreign Bias, Cultural Distance, and Economic Development

# PART 1 – FOREIGN BIAS, CULTURAL DISTANCE, AND ECONOMIC DEVELOPMENT

## 1. Introduction

The relationship between economics and national culture is well-established, but the relationship between finance and national culture is largely assumed based on similarities between economics and finance. This is a fair assumption given the connection between economics and finance. But what of the relationship between culture and finance? Other research has also found connections between economics and culture. For example, Franke et al. (1991) finds that Geert Hofstede's national cultural dimension of individualism is positively related to economic growth between 1965 and 1980. Furthermore, at the individual level, Diener and Diener (1995) finds that individualism is positively related with personal wealth in a sample of 13,000 people across 31 nations.

Given these two studies, perhaps the assumption of an association between economics and finance with national culture is fair, but there is still value in the empirical validation of these similarities. That is the aim of this research. This research establishes empirical validation that the curvilinear relationship between national culture and national wealth (GDP/capita) found by Tang and Koveos (2008) also applies to national culture and aggregate investment data and that this effect is more pronounced for developing nations. The implication is that further cross-cultural investments research may need to provide additional control variables for economic development differences when such nations are present in the sample.

The setting for this empirical validation is in the relationship between national culture and foreign bias in portfolio investment. However, early behavioral finance research about investment biases focused instead on "home bias," the preference investors have in their portfolio choices for companies that are located closer to them. Coval and Moskowitz (1999) studies the investment preferences of U.S. investment funds, finding that funds prefer companies with local headquarters over other companies with headquarters located further away. Grinblatt and Keloharju (2001) observes this phenomenon abroad in Finnish individual investors and finds that the effect of distance matters less for experienced investors than for inexperienced investors from households. That research also introduces other control variables to the study of home bias besides geographic distance, such as language and culture.

Though that research is among the first to reference culture in the study of investment biases, cultural differences are only defined by cross-national differences between Swedish and Finnish investors. However, some of the personality traits found in cross-cultural frameworks, such as sociability, are the focus of the later study Hong, Kubik, and Stein (2004). That study also began to control for other factors that are of interest to researchers creating cross-cultural frameworks, such as income, ethnicity, and education.

As for the bias towards overinvesting in foreign assets, Chan, Covrig, and Ng define this "foreign bias" as the weighting of a nation in a portfolio relative to the total portfolio, which is then scaled by the stock market capitalization of that nation relative to the capitalizations of all the other nations in the portfolio (2005). Chan et al. (2005) uses this distinction to separate home bias from foreign bias for measurement. Beugelsdijk and Frijns (2010) (henceforth BF) test hypotheses related to Chan et al.'s measure of foreign bias with Kogut and Singh's cultural distance index of Geert Hofstede's cultural dimensions (2005; 2001). Kogut and Singh's cultural distance index is made up of all four of Hofstede's main cultural dimensions: individualism, uncertainty avoidance, masculinity/femininity, power distance (1988).

As it relates to foreign bias, people from individualistic cultures have weaker relationships with people outside of their family (Hofstede, 2001). BF hypothesizes that such weaker relationships could lead to an individual failing to confer with their group about decisions, which would then lead to greater risk-taking and therefore overallocations--foreign bias (2010). They indeed find that the individualism of home markets of investment has a positive effect with foreign host market investment ('home' is the nation where the fund is domiciled, 'host' is the nation receiving investment). The cultural dimension of uncertainty avoidance is about perceptions of time, such that cultures with weak uncertainty avoidance have people who are more comfortable with uncertainty about the future, whereas cultures with strong uncertainty avoidance instill fear about uncertainty into members of their culture (Hofstede, 2001). Regarding foreign bias, BF posit that uncertainty avoidance should do with how comfortable investors are with risk based on the findings of Kwok and Tadesse, who find that nations with higher uncertainty avoidance also tend to have bank-based financial systems with more rules and regulations (2006). BF also finds that investment funds from home markets with higher uncertainty avoidance scores tend to invest less in non-local host markets.

The cultural dimensions of individualism and uncertainty avoidance are chosen from

Geert Hofstede's research for study in BF because of their purported bearing on economics and on risk, the avoidance of which is one of the primary reasons for portfolio diversification (Kirkman, Lowe, and Gibson, 2006; Markowitz, 1952, 1959). However, the cultural distance index also includes two other dimensions, masculinity/femininity and power distance. Cultures that are more masculine emphasize "assertiveness" and boasting, while more feminine cultures emphasize modesty and demureness (Hofstede, 2001; 2011). Male investors are found to be overconfident in their investment decisions by Barber and Odean (2001), leading to the assumption of a positive relationship dimension with portfolio allocations. For power distance, cultures with higher power distance have more sharply defined social hierarchy boundaries than cultures with lower power distance (Hofstede, 2001). Such sharply defined social boundaries could again lead to the individual failing to confer with the group and therefore to greater risk-taking and higher allocations, as with individualism. Kogut and Singh indexed the home and host country measures of this dimension along with those of masculinity/femininity, individualism, and uncertainty avoidance in their cultural distance index of Geert Hofstede's cultural dimensions (1988, 2010).

BF associate cultural distance with portfolio investment on the basis that greater cultural distance between two countries would result in greater overall differences between the four constituent dimensions of the index. This difference leads to greater unfamiliarity between the nations, which then leads to less investment. BF suggest that this logic follows the findings of Huberman (2001) that investors with a greater familiarity with domestic stocks feel greater unfamiliarity with foreign stocks. BF therefore suggest that risk aversion alone does not cause lower foreign investment, but also greater cultural unfamiliarity.

However, BF only finds an effect for this measure on foreign bias after separating their sample into two portfolios. These portfolios are defined by the economic development of the host nations of investment. After hypothesizing a general negative relationship between cultural distance and foreign bias, they instead find a negative and insignificant effect for their portfolio of all nations. However, when the sample is split by economic development, they find a negative and significant relationship for their portfolio of developed host nations, and a positive but insignificant relationship for their portfolio of developing market nations.

To explain the results, BF offers Kwok and Reeb's "Upstream-Downstream" theory, though the theory is not tested (2000). The original purpose of this theory is to explain the direction of FDI from developed to developing market nations and vice-versa. As BF applies

this theory to portfolio investment, funds from developed nations invest "downstream" for higher returns (with accompanying higher risk) while funds from developing nations invest "upstream" for lower risk (with accompanying lower returns).

This research investigates part of this theory's ability to explain the relationship between foreign bias and cultural distance. To do this, this research uses the same methodology from BF with a few changes. The first of these changes is in the sample, which is only composed of U.S. funds. Because this study controls for the home country of investment with a sample of funds from the U.S., the second change follows: BF studies the effects of cultural distance on foreign bias in a model specification which also includes the home market's dimensions of individualism and uncertainty avoidance, and those two cultural dimensions are now not required in the specification, allowing for a more parsimonious specification that focuses entirely on the cultural distance index. This follows the original research on cultural distance by Kogut and Singh, which also controlled for the home country of distance by only using the cultural distance of the United States in relation to other countries (1988). Furthermore, this focus on cultural distance to the exclusion of other cultural dimensions removes any sort of correlative influence whatsoever. A third difference that follows from using a sample of U.S. investment funds is that this research also focuses on investment to similarly developed nations and investment "downstream" investment to developing markets. Ideally, a sample would be balanced to also include investment funds from emerging markets that invest "upstream" to developed nations. However, a search in the Bloomberg information system for such funds yields a list of only twelve funds. This makes finding a balanced and matched sample to test the upstream-downstream hypothesis problematic. Therefore, given the difficulties of testing the applicability of the upstream-downstream hypothesis to foreign portfolio allocations, this research focuses instead on "downstream" investment from developed market investment funds (in this case, the U.S.).

However, the signs of the findings from this research do not fully support those predicted by the upstream-downstream theory. Tests, including K-means clustering, indicate that a binary classification of economic development is too simple for the sample. Therefore, additional economic development control variables are added to the main specification. The original study on foreign bias by Chan, Covrig, and Ng (2005) uses five variables to control for differences in economic development that are not present in the specification used by BF. Those variables are added to a new alternate specification. One of these variables is the log

of GDP/capita, a variable that is also found to have a curvilinear relationship with the cultural dimensions of power distance and individualism.

Tang and Koveos measure GDP/capita for nations represented in Hofstede's dimensions from 1970-1974 and again from 1990-1994, finding that most nations have changed in economic development relative to one another, and that the GDP/capita of these nations has a curvilinear relationship with the dimensions of power distance and individualism. On that basis, the authors adjust the cultural dimensions for these changes. In terms of the sample of this research, of the nations that are present in the sample of Tang and Koveos (2008), all but three nations change in their economic development rankings relative to one another between 1970-1974 and 1990-1994. However, those three nations (France, Greece, and India) have all had their GDP/capita change relative to the other nations between 1990-1994 and the timespan of this research. Given these relative changes in national wealth over this time period, this research expects and finds a similar curvilinear relationship between cultural distance and the logarithm of GDP/capita for this sample from 2006-2015.[1] In Figure 1, a polynomial fit to a plot of cultural distance and the log of GDP/capita shows a similar curvilinear relationship. Figure 2 shows that this curvilinear relationship existed within the 48 host nations of investment in the sample of BF as well. A more pronounced curve upwards towards the right indicates that some additional non-linearity is present in that sample which could explain some of the inconclusive results from the application of a linear tobit analysis.

To verify that this overall curvilinear relationship exists out-of-sample, cultural distance is also calculated and matched with all available GDP/Capita data from the World Bank (see Figure 3). 68 nations that have national culture dimensions also have GDP/Capita data available, though missing GDP/Capita data in earlier years causes an upwards bias in the number of observations towards the present. Despite this, the curvilinear relationship between GDP/Capita and cultural dimensions observed by Tang and Koveos is also present for cultural distance and is persistent over the past 45 years. Figure 3 shows the mean values of cultural distance and the mean of the log of GDP/capita over the two 5-year time periods surveyed by Tang and Koveos (1970-1974 and 1990-1994), as well as a comparable five-year time period within the panel of this data (2010-2014). Comparable economic development classification

[1] Both Chan et al. (2005) and Tang and Koveos (2008) take the logarithm of GDP/capita, but for different reasons. Chan et al. (2005) does so to normalize the variable while Tang and Koveos (2008) do so to scale the variable to match Hofstede's dimensions, which are on a percentile scale.

data was not available from the World Economic Forum for these three time periods, but GDP/Capita increases as the three successive plots shift further to the right, showing the increasing wealth of nations. Fitted polynomial curves for each of the three timeframes show a curvilinear relationship between cultural distance and national wealth that is gradually flattening over time with each curve. Considered together, figures 1 and 2 validate that the curvilinear relationship in Figure 3 has not disappeared yet, and that it exists for the cultural distance index despite that index containing two cultural dimensions for which Tang and Koveos (2008) found no curvilinear relationship with national wealth (masculinity or uncertainty avoidance). However, it also shows that this curvilinearity is more pronounced out-of-sample than it is in this research or in BF, a difference that is perhaps due to outliers.

Once the log of GDP/capita is added to the specification, along with four other economic development control variables from Chan et al. (2005), the sign for the cultural distance coefficient of the developing nation portfolio changes from positive to negative. This change simultaneously provides support for the downstream portion of the upstream-downstream hypothesis and also indicates that this hypothesis may be explaining Tang and Koveos' curvilinearity as well. However, the sign for the coefficient of developed portfolio does not change, perhaps due to the steeper slope for developing nations observed in Figure 1. The sign for developing nations flips once again when cultural dimension scores that have been updated by Tang and Koveos for this curvilinear relationship are substituted into the cultural distance index, as one might expect when the same curvilinear relationship is being controlled for twice, providing additional support for this explanation. Thus, in addition to representing the first evidence in the finance literature of this curvilinear relationship between culture and national wealth, it appears that the curvilinear nature of culture and economic development matters much more for developing nations than it does for developed nations.

## 2. Hypotheses

In order to demonstrate these relationships between national wealth and national culture for cultural distance, this research draws upon the hypotheses for portfolio allocations and cultural distance from BF and alters them to suit the downstream portion of Kwok and Reeb's upstream-downstream hypothesis that is the focus of this U.S. investment fund sample. In their sample composed of funds from both developed and developing markets, BF

hypothesize finding negative relationships between cultural distance and foreign bias for their combined market portfolio and developed market portfolio, and a positive relationship for the developing market portfolio (2010). Under the upstream-downstream hypothesis, investors from developed markets invest 'downstream' to developing nations for greater risk-return, and investors from developing markets invest 'upstream' to developed nations for lower risk-return. For this sample of U.S. investment funds, these developed market investment funds would invest "downstream" to developing markets and comparably less to similarly developed nations, for a negative relationship between foreign bias and cultural distance between the U.S. and developed host nations of investment (Kwok and Reeb, 2000). As such, this research expects:

*Hypothesis 1a. Higher cultural distance between the U.S. and the host markets of investment in the combined market portfolio is associated with in lower foreign portfolio allocations.*

*Hypothesis 1b. Higher cultural distance between the U.S. and the host markets of investment in the developed market portfolio is associated with lower foreign portfolio allocations.*

*Hypothesis 1c. Higher cultural distance between the U.S. and the host markets of investment in the developing market portfolio is associated with higher foreign portfolio allocations.*

## 3. Data

This research controls for the home market of investment by using a sample of U.S. investment funds investing in 36 host markets of investment. The list of U.S. funds was compiled using Bloomberg, using the search terms "fund domiciled in the U.S.", "fund managers located in the U.S.", as well as with a "global geographic focus" and "global allocation investment strategy." This focus and strategy is necessary to improve the external validity of the results given the lower-than-average level of foreign bias for the U.S. observed

by BF. The full sample contains portfolio weightings from 475 U.S. investment funds from Q1-2006 to Q4-2015. After the formation of the fund list, all portfolio weighting and return data was collected from Morningstar Direct. The 36 host markets of investment are chosen primarily because of the availability of data for market-level control variables, the variables of which are selected from BF.

When the 36 host markets of investment are separated into two portfolios based on their economic development, 26 markets are represented in the developed market portfolio and ten markets are represented in the developing market portfolio. The separation of these markets is based on World Economic Forum data that divides markets into "high-income" markets, the highest income category in the income classification, and markets that are otherwise. This proportion is approximately similar to that in the sample in BF, which has one home market and 12 host markets of investment that are not high-income economies. In this research, finding funds with allocations in many developing nations proved to be difficult. In addition, data for market-level control variables for many different developing nations was not available as well. Despite this, a fair amount of variation for funds from nations of both types of economic development is represented in this sample.

## 4. Methodology

There are two measures of importance in this analysis. The first is foreign bias, the dependent variable that is operationalized in this research in the same manner as in BF and in the research from which it originates, Chan et al. (2005). The second measure is the independent variable of interest, cultural distance. This variable is operationalized in the same manner as BF where it is modified from its original use in Kogut and Singh (1988).

The foreign bias measure compares the actual level of investment in a market to the optimal level of investment in that market, such that values above a one-to-one ratio of these levels are deemed to exhibit foreign bias. A logarithm transformation is taken to normalize foreign bias because only positive values of foreign bias are of interest for an analysis of over-investment. This measure is used in this research in the same manner as it is used in Chan et al. (2005), Anderson et al. (2010), and BF:

$$FBIAS_{ij} = log\left(\frac{w_{ij}}{w_j^*}\right),\ for\ i \neq j \tag{1}$$

In this sample, *i* represents the U.S. in all cases since this analysis controls for the home country of investment using only U.S.-based investment funds. The numerator of foreign bias is represented by $w_{ij}$:

$$w_{ij}=\frac{MV_j}{\sum_{j=1}^{n} MV_{ij}} \tag{2}$$

which is the ratio of $MV_j$, the percentage portfolio weighting allocated to host market *j,* to the denominator, which is the total amount of investment allocated to the markets in this sample. As for the denominator of foreign bias $w^*_j$ in (3), $MV_j^*$ is the market capitalization of host market *j* in relation to the denominator, which is the market capitalization of all markets invested in by the U.S. funds in the sample:

$$w_j^*=\frac{MV_j^*}{\sum_{i=1}^{n} MV_i^*} \tag{3}$$

The second measure of consequence in this research is Kogut and Singh's cultural distance index of Geert Hofstede's cultural dimensions of individualism, uncertainty avoidance, masculinity/femininity, and power distance, which is originally expressed in their research as (1988):

$$CD_j = \sum_{k=1}^{4} \{(I_{kj} - I_{ku})^2 / V_k\} / 4 \tag{4}$$

Where $CD_j$ is the cultural distance of market *j* from the United States. $I_{kj}$ is the index of cultural dimension *k* for market *j*, and $I_{ku}$ is the score for cultural dimension *k* for *u*, which represents the U.S. $V_k$ is the variance of the index of cultural dimension *k*.

However, BF uses a modified version of this index to accommodate multiple countries besides the United States. That modified version of the index also uses a Euclidean distance measure as well that adds a square root transformation to the measure and removes the division by the number of cultural dimensions in the index:

$$CD_{ij} = \sqrt{\sum_{k=1}^{4} \{(I_{kj} - I_{ki})^2 / V_k\}} \tag{5}$$

where cultural distance measures distances between multiple home and host markets, such that $CD_{ij}$ is the distance between home market *i* and host market *j* for cultural dimension *k*. The Euclidean modification is justified by BF due to prior criticisms by Shenkar of the implicit assumption of the cultural distance index that gives equal weighting to home and host markets (2001). This research uses the original cultural distance measure of Kogut and Singh (1988) since it uses only the home market of the U.S., but it also applies a Euclidean measure to it, following BF:

$$CD_j = \sqrt{\sum_{k=1}^{4} \{(I_{kj}\text{-}I_{ku})^2 / V_k} \quad (6)$$

The model specification for the dependent variable of foreign bias combines it with independent variables including cultural distance. That independent variable of interest, cultural distance ($Culture_{uj}$), is specified along with additional market-level controls within the following model specification drawn from BF:

$$FBIAS_{uj} = f(HBIAS_u, Culture_{uj}, Attractiveness_j, Regional\ trade\ regime_j, Risk - return\ profile_j, Familiarity_{uj}) \quad (7)$$

Where $HBIAS_u$ is the home bias of the U.S. investment funds towards investing in the United States. Following Chan et al. (2005) and BF, this is specified as an independent variable in the model specification for foreign bias. The other control variables are drawn directly from the model specification of BF: The $Attractiveness_j$ variables measure the attractiveness of the market, the *regional trade regime*$_j$ variables denote whether the market in question is a member of a trade organization, the *Risk-return profile*$_j$ variables denote the level of risk present in the fund, and the $familiarity_{uj}$ variables denote whether the fund and market hold some similarity such as language or distance. These variables are described in table 1.

The host market *attractiveness* variables include controls for transaction costs, tax rates, host stock market development, host capital controls, and host economic growth rate as it is measured by gross domestic product. Transaction costs that are drawn from the research of Domowitz, Glen, and Madhavan (2001), and implicit costs are used because the sample is made up of U.S. funds and U.S. explicit transaction costs are declining. Tax levels are

obtained from Price Waterhouse Coopers (PWC) Corporate Tax guides for each of the years in the sample. BF posits that the host market's attractiveness would be negatively related to tax levels and transaction costs and that is expected here as well. Stock market development is measured as the stock market capitalization for that market's market for that year divided by the GDP of that market for that year, and both capitalization and GDP measures are obtained from the World Bank and FRED. Host market capital controls are measured using the Heritage Foundation's economic freedom index, which provides a measure of the capital controls of foreign transactions for markets on a scale of 1-100, where markets with higher scores have fewer capital restrictions. Host market economic growth is measured as the five-year lagged average GDP growth rate, where GDP data is found using available Standard & Poors data by way of the World Bank.

The *regional trade regime* variables include three indicator variables that separate markets that are members of the EU, NAFTA, and Asean. In the developed and developing market portfolio sorts, these variables were sometimes omitted from the analyses due to lack of variation or due to a lack of membership in these trade regimes along the dividing line of economic development that sorted these portfolios by developed and developing markets.

The *Risk-return profile* variables include the one-year and three-year lagged returns as well as the stock market volatility. Unlike the other control variables, these variables vary from the *risk-return* variables used in BF. Like that research, the one-year return is used, but unlike that research, the lagged three-year return is used instead of the lagged five-year return. This is done to ensure that the sample size remains large enough for robust results given the likelihood that funds are liquidated or acquired over longer periods of time. The one-year and three-year returns are calculated using monthly return data following BF, the data for which is collected from Morningstar Direct. Furthermore, since this research controls for the home market of investment, a variable measuring the return correlation between home and host market investment funds is not included in this analysis. However, a variable measuring stock market volatility differences between home and host markets is included following BF and it is measured using volatility data from WRDS and FRED.

Among the *familiarity* variables, familiarity (or common language) is an indicator variable that denotes whether the host market of investment uses English as a native language. Distance is the logarithm of the great-circle distance between the center of the U.S. and the center of the host market of investment. Finally, the legal system of the host market of

investment is measured using an indicator variable that measures whether the nation uses a common law system, which provides greater protections to shareholders (La Porta, Lopez-de-Silanes, Shleifer, Vishny, 1998).

The variables in this model specification are analyzed using a left-censored tobit, following BF, and as in that research, the left-censored tobit is chosen to account for any unobserved bias in the sample resulting from the focus on positive values of foreign bias. This counters any selection bias that might occur from this focus following Heckman (1979). For the same reason, following BF, for funds with no allocations for a market during a period, the observations are kept in the sample but weightings are replaced by .001 which then result in negative values of foreign bias that are replaced by zero values in the tobit analysis.

## 5. Results

Table 2 has the descriptive statistics for the variables in the study, including the mean, median, and standard deviation. The mean and median levels of foreign bias are provided prior to its left-censoring. The negative values denote that positive values of foreign bias are anomalous and this follows other studies of foreign bias. The means of the indicator variables (medians are 0) indicate the prevalence of these indicators in the sample.

Table 3 has the summary statistics for the data with average foreign bias, average weighting, optimal portfolio weighting, and average cultural distances for all 36 markets. Although positive values of foreign bias are the focus on this research, the average foreign bias measures for each of the 36 markets across all 10 years in the sample are all negative. Except for Finland, the same was true for the host markets of BF.

In preliminary tobit analysis (Table 4), the signs for the cultural distance coefficients are all positive, in sharp contrast to mix of positive and negative signs that are expected following the upstream-downstream theory and the results from BF. Since the sign for the coefficient for cultural distance in the developing market portfolio is positive, these results only partially support the upstream-downstream hypothesis to explain the relationship between foreign bias and cultural distance. It is on this basis that additional tests are made to discern the effects of economic development differences on foreign bias, as those differences are defined along the dividing line of “high income” nations and otherwise as used by the World Economic Forum. Three additional tests related to economic development are applied

to the data: a hierarchical linear model that allows the slopes of individual foreign bias regression lines to randomly vary according to the economic development indicator variable, a repeated measures MANOVA, and a time-series K-means clustering algorithm.

The purpose of the left-censored hierarchical linear model is to determine whether or not there is any variation in the individual slopes of the investment fund allocations due to economic development differences between the host countries of allocation. The resulting analysis does not find any significant variation in foreign bias due to economic development differences. The repeated measures MANOVA discerns whether country differences (such as that of the stock market capitalization in the denominator of the foreign bias measure), time differences over the panel, or economic development differences contribute to the variation of foreign bias. The binary measure of economic development differences does not contribute any variation whatsoever. Finally, separate time-series K-means cluster analyses with two clusters (to find developed and developing markets) and three clusters (to allow for additional variation) are conducted using foreign bias and cultural distance values paired together in a two-dimensional coordinate system. The within cluster sum-of-squares for the analysis (analogous to $R^2$ in linear regression) jumps from 68.6% to 86.8% when three clusters are used instead of two clusters. This supports the notion that a binary classification of economic development is too simplistic for foreign bias and cultural distance.

It is on the basis of these tests that additional variables are added to the model specification (Table 5). Chan et al. (2005) uses five additional market-level variables to control for differences in economic development that are not in BF. These first four of these variables are the GDP (%), log of GDP per capita, the trade balance scaled by GDP, and FDI scaled by GDP. The data for these variables is all obtained from the World Bank. The final economic development control variable concerns the creditworthiness of the country as it is measured by the annual country credit ratings published by Institutional Investor magazine.

Once the additional economic development control variables are added to the specification, the signs remain unchanged for all portfolios except the developing market portfolio. The sign for the developing market portfolio flips from positive to negative, signifying a sensitivity to economic development that goes beyond that of developed market nations. This sensitivity is more plainly seen in plots of the relationship between cultural distance and GDP/capita, where the fitted curve sharply rises for the developing nations, and then slowly curves further downward for the developed nations (see Figure 1).

Although Tang and Koveos (2008) does not test for a curvilinear relationship between the cultural distance index and GDP/capita, that research updates the scores of the index's four component cultural dimensions to account for curvilinearity with national wealth. The first of the robustness tests in panel A of table 6 uses these updated scores in the cultural distance index. Given that the revised model specification includes several variables that are already scaled by GDP, cultural distance calculated with Tang and Koveos' updated cultural dimension scores would not be expected to demonstrate the predicted signs. In fact, the cultural distance results should not be robust to the inclusion of this adjusted cultural dimension scores if the curvilinear relationship found by Tang and Koveos (2008) is already being controlled for with these new added economic development control variables from Chan et al. (2005). Indeed, this is what happens for the developing market portfolio. The sign for cultural distance with the developing market portfolio becomes positive, but insignificant, once this curvilinear relationship is controlled for a second time. It must be noted that these updated scores are not available for all of the nations in the sample and that two developing nations and one developed nation are dropped from the analysis for this robustness test. Hungary, the Czech Republic, and Taiwan (respectively) are not present in the sample of nations used with scores from Tang and Koveos (2008). However, the alternate specification results of table 5 are robust without these nations (combined portfolio: 0.114 , s.e. = 0.002 ; developed portfolio: 0.41 , s.e. = 0.002; developing portfolio: -0.017, s.e. = 0.002).

While these new results provide support for the notion that the curvilinear relationship observed by Tang and Koveos (2008) is present in this sample, there does appear to be the need for additional economic development control variables besides GDP per capita for the effect to appear. Along these lines, a variety of combinations of these five variables are tested in the alternate specification. A minimum of three of these variables need to be present for the observed change in cultural distance coefficient sign to hold: GDP per capita, the credit variable, and at least one other economic control variable needs to be present for the sign of cultural distance in the developing market portfolio to change. This suggests that the curvilinear relationship between national culture and national wealth that is observed by Tang and Koveos (2008) may now go beyond GDP per capita. Figure 4 shows that this curvilinear (nearly linear) relationship is also present for the credit ratings of nations. Since Institutional investor magazine uses a percentile scale for this variable, and since Chan et al. (2005) did not take a logarithm of this variable, no logarithm was taken. Just as in Figure 1 for

GDP/capita, the direction of the fitted polynomial curve in Figure 4 also seems to depend on the economic development of nations. However, similar plots of cultural distance against the other economic development variables yielded no similar relationships.

This introduces the possibility that the curvilinearity of national culture with indicators of national wealth may be progressing beyond GDP/capita. Reasons for this progression are beyond the scope of this research, but for the practical purposes of controlling for economic development differences in cross-cultural investments research, this finding has some importance for studies that include developing market nations or focus on such nations. As to whether this curvilinear relationship extends to foreign bias, figures 5 and 6 show three-dimensional plots of foreign bias, cultural distance, and the economic development indicators of either GDP/capita or creditworthiness. These two plots show that the curvilinear relationships shown in Figures 1, 2, and 3 extend to foreign bias as well.

The other robustness tests in table are largely formalities to show that the results for the developing market portfolio persist. The next robustness test in Panel A includes a variable in the model specification that proxies for institutional quality, which is introduced in BF and this research since both studies use home market(s) that are highly-developed economies. The purpose for this proxy is to counter any possible omitted variable bias stemming from the disregard of differences in institutional quality between the U.S. and host markets of investment. This measure uses a five-item principal component made of items for the rule of law, public enforcement of the rule of law for shareholders, the level of insider trading, risk of expropriation of funds, and financial system efficiency. These items are drawn from La Porta et al. (1998) and Djankov et al. (2008). The sign of cultural distance for the developing market portfolio is robust to the inclusion of this variable.

Home and host market random-effects are also estimated to account for any market variation outside of the results. The random effects are estimated across the ten years of the panel and the signs of the coefficients do not change though the coefficients lose significance. OLS with and without the zero values included (zero-truncation instead of left-censoring at zero) is also conducted, as well as OLS with the Heckman adjustment. Again, as with the test for institutional quality, the signs and significance remain strong and unchanged, though the sample size of the developing market portfolio makes zero-truncated OLS infeasible. This robust results for the Heckman adjustment that corrects for any sample selection bias is relevant because this sample is composed of global allocation funds that are chosen to counter

a lower than average level of foreign bias present in the U.S. (Beugelsdijk and Frijns 2010). Probits are also estimated and the signs and significance of cultural distance do not change in those models either, though coefficient sizes vary. The developing market probit fails to converge for likely the same reasons as the zero-truncated OLS test.

In addition, due to the simplification of the familiarity (common language) variable from BF in this sample of U.S. investment funds, a robustness test that adds the future-time reference of the language of the host market (strong or weak) is conducted. This added variable controls for differences in how different cultures perceive time (Chen 2013). Strong future-time referent languages distinctly denote the times of events while weak future-time reference languages do not. Such differences could bear on perceptions of risk if the immediacy of risk is more apparent in a language with a strong future-time reference. The results are robust to the inclusion of this variable.

Tang and Koveos (2008) remark that the curvilinear relationship that has developed between cultural dimensions and national wealth has occurred in part because of institutional changes over the intervening decades. Given the centrality of economic development to this new specification, a decomposition of the institutional quality index into its five constituent measures is made as well. These results (Panel B) are notable only because both the combined market portfolio and the developed market portfolio both have negative coefficients for the 'rule of law' measure; there is a negative relationship between the amount of law and the amount of portfolio allocation. The 'rule of law' measure is an indication of the amount of law in the country as measured by the International Country Risk (ICR) rating agency.

Finally, following BF, the absolute value of the differences between home and host country measures of each of the four major cultural dimension scores (using Hofstede's scores) are measured as well. No discernable pattern emerges except for individualism, which is consistently negative across all three portfolios.

The results of the robustness tests begin to break down for the developing market portfolio, likely due to the small sample size of funds with a positive value of foreign bias for developing markets. Perhaps it is also because of the comparably fewer number of developing markets than developing markets as well. Although the former problem is unique to this research since it focuses on a subset of investment funds based on the global allocation fund strategy, the latter problem is in common to BF. Despite this limitation, the tobits and some robustness tests for the tobits are still significant for that portfolio. This provides additional

support that the relationship between cultural distance and national wealth is more pronounced for developing nations than it is for developed market economies, and that this curvilinearity should be accounted for in cross-cultural investments research.

## 6. Conclusions

In summary, this research begins by replicating the methodology of BF as closely as possible but with exception made to further explore the less conclusive results for cultural distance in that research. A result of these differences is that this research focuses on "downstream" investment from the upstream-downstream hypothesis. However, only some of the predicted downstream investment results appear when additional variables controlling for differences in economic development are added.

The need for the inclusion of economic development control variables to obtain the predicted results not only to partially supports the downstream portion of the upstream-downstream hypothesis offered by BF, but also references the study on national wealth and national culture by Tang and Koveos (2008). Indeed, the results of the robustness tests that use the updated cultural dimension scores from that research, where the signs flip when those updated scores are included with economic development control variables, supports this notion. Considered together, these results suggest that the upstream-downstream hypothesis may actually be attempting to explain this curvilinear relationship. However, the upstream-downstream hypothesis was offered by BF to explain the results for cultural distance, not the results for the home market dimensions of individualism and uncertainty avoidance. This is perhaps because the cultural distance index includes both of those dimensions, and for both host and home countries of investment as well. This results in a more complex relationship that makes this curvilinear relationship more pronounced despite the presence of the dimensions of masculinity and power distance in the index, dimensions for which Tang and Koveos (2008) found no relationship with national wealth. Plots of cultural distance with GDP/capita and creditworthiness which mirror those in Tang and Koveos (2008) confirm this curvilinear relationship for those two economic development indicators. Therefore, in addition to demonstrating evidence for a relationship between cultural distance and foreign bias, the results also demonstrate the need for cross-cultural studies in finance with developing nations in their sample to properly to control for economic development differences as well.

# PART 2

# Religion and Foreign Bias in Portfolio Investment

# PART 2 – RELIGION AND FOREIGN BIAS IN PORTFOLIO INVESTMENT

## 7. Introduction

These are difficult days for managed investment funds. Investment in passive funds increased by $692 billion in 2017 while nearly $7 billion flowed out of actively managed funds in the same period (Napach, 2017). Actively managed funds have begun to adapt by learning more about the innate behavioral biases that affect their teams. In particular, Dennis Lynch, head of U.S. growth investing at Morgan Stanley, says that "We all have biases. When you're under pressure, it's easy to default to your internal programming. But part of being a good decision-maker is being self-aware and understanding why you're making the decisions you are… You have to balance the two things: culture and cognitive diversity." Although Lynch says that he prefers giving his fund managers Myers-Briggs and Enneagram personality tests, there is a growing literature on behavioral investment biases that can also benefit fund managers (Ciolli, 2018).

That literature aims to explain why irrational portfolio allocations that abound in portfolio investment. In theory, rational investors should always diversify their portfolios according to a set ratio. This diversification ratio should be set according to the proportion of the stock market capitalization of a particular country to the total market capitalization of the portfolio. In practice, however, investors continually exhibit irrational preferences towards their investment allocations, regularly defying this proportion and the theory behind it by overweighting their portfolios in different foreign equities (Markowitz, 1959).

Such explanations for this irrational portfolio investment initially focused on the more prevalent phenomenon of why investors might choose to overweight their portfolios in local investments, in what has been termed in the literature as "home bias." As in this research, early research in home bias focused on the investment preferences of U.S. investment funds. Coval and Moskowitz (1999) finds that U.S. investment funds prefer companies with headquarters local to them over other companies with headquarters located further away, and that these preferences are manifested in their portfolio choices. Further evidence was found by Huberman (2001) for similar preferences for individual investors instead of investment funds.

Home bias is very common, but far more anomalous and difficult to explain is the

contrasting preference towards overinvestment in foreign assets, or "foreign bias," which is the focus of Chan, Covrig, and Ng (2005). This study found foreign bias to be anomalous in comparison with home bias, which is much more common in portfolio investment. Behavioral explanations for foreign bias have since examined the effects of culture on foreign bias in both Anderson, Fedenia, Hirschey, and Skiba (2011) and BF. Geert Hofstede's cultural dimensions are used in both studies. These dimensions measure the proclivities of different national cultures and emerge based on a factor analysis of surveys conducted with over 100,000 people in the late 1970s and early 1980s. Four primary dimensions emerged from this confirmatory factor analysis: individualism/collectivism, uncertainty avoidance, masculinity/femininity, and power distance. However, though both Anderson et al. (2010) and BF test similar hypotheses relating foreign bias in portfolio investment, only individualism/collectivism and uncertainty avoidance are used in both studies. This is perhaps due to their purported bearing on economics and on risk, the avoidance of which is one of the primary reasons for portfolio diversification (Kirkman, Lowe, and Gibson, 2006).

The cultural dimension of uncertainty avoidance is about perceptions of time, such that cultures with weak uncertainty avoidance have people who are more comfortable with uncertainty about the future, whereas cultures with strong uncertainty avoidance instill fear about uncertainty into members of their culture (Hofstede, 2001). BF posits that uncertainty avoidance should do with how comfortable investors are with risk based on the findings of Kwok and Tadesse, who find that nations with higher uncertainty avoidance also tend to have bank-based financial systems with more rules and regulations (2006). BF finds that investment funds from home markets with higher uncertainty avoidance scores tend to invest less in non-local host markets, and Anderson et al. (2010) confirms these findings. Regarding foreign bias and individualism, people from individualistic cultures have weaker relationships with people outside of their family (Hofstede, 2001). BF hypothesizes that such weaker relationships could lead to an individual failing to confer with their group about decisions, which would then lead to greater risk-taking and then to foreign bias in portfolio investment. Both BF and Anderson et al. (2010) indeed find that the individualism of home markets of investment has a positive effect with foreign host market investment.

Though these two studies present cross-cultural behavioral research on the topic of culture and foreign bias, there has not been yet any research on the topic of religion and foreign bias, nor is there any prior theory associating religion with foreign bias. Yet studies

of culture and religion in financial decisions are often grouped or conducted together because religion arguably relates to finance in a similarly behavioral context as culture. Therefore, to bridge the behavioral research of culture and foreign bias with religion, this research associates foreign bias with religion by using the prior theory associating foreign bias with individualism/collectivism instead of uncertainty avoidance. This association is made under the presumption that religion is more about group cohesion than it is about the perceptions of time or comfort with rules and regulations. Although the collectivism portion of the individualism/collectivism dimension is not emphasized in either BF or Anderson et al. (2010), collectivism is present in the theory of both studies because it is the inverse of individualism. Unlike people in individualistic cultures, people in collectivistic cultures have stronger relationships with people within their families and with close social groups than with others. Therefore, this study inverts the supported hypotheses regarding individualism from both of those studies to claim that those from more collectivistic cultures would tend to take fewer risks and be less likely to exhibit foreign bias in portfolio investment. It is on the basis of religion's cohesion among adherents this association between collectivism and foreign bias is adapted to associate religion and risk preferences in portfolio investment, such that greater levels of religious adherence are equated with greater levels of collectivism and hence less risk-taking.

Studies of religion have associated greater levels of religious adherence with less risk-taking in different contexts. Outside of the finance literature, Miller and Hoffman (1995) finds an inverse relationship between risk attitudes and religiosity, or the proportion of church-going adherents to the total population. Osoba (2003) finds that people with lower risk preferences attend church more often (as adherents) than people with higher risk preferences. The finance literature has applied these findings to risk-taking in finance as well. Hilary and Hui (2009) studies the U.S. county-level effects of religiosity on the risk preferences of firms, as such risk preferences are represented by the internal rates of return required by those firms to invest in projects. Hilary and Hui find that firms residing in counties with greater religiosity have higher risk aversion and prefer higher rates of returns for their projects.

Although there is no concurrent study in finance of religion and risk-taking in portfolio investment, it is on the basis of Hilary and Hui (2009) that this study similarly associates higher levels of religiosity with lower levels of risk-taking. Since this association is made through prior theory from cross-cultural research on foreign bias, this research also uses a

model specification and analyses from such research, that of BF. Like BF, this research uses a left-censored tobit to focus on positive values of foreign bias and uses many of the same robustness checks. However, this research also adds some of the robustness checks used by Hilary and Hui (2009) due to the focus of this study on religion. Therefore, this study extends the literature of the behavioral study of investment biases by bringing together the theory of religion and risk in finance with pre-existing theory on culture and foreign bias, while empirically testing that theory using methodologies developed in research on culture and foreign bias in portfolio investment.

Besides the measure of religiosity, other religion-related measures have been used in the finance literature before as well. Kumar (2009) and Kumar, Page, and Spalt (2011) use the ratio of Catholics to Protestants, or "CP ratio," in a given U.S. county as a proxy for gambling preferences. This measure is based on differing gambling preferences between these denominations, where Catholics have a higher preference for gambling. This measure has been used in the past as a proxy for such financial risk-taking activities as the holding of lottery-type stocks (Kumar 2009; Kumar et al. 2011) and innovation (Chen, Podolski, Rhee, and Veeraraghavan 2014). In the context of the risk-taking behavior of overallocation to lottery-type stocks and risk-bearing innovation, a greater level of gambling preferences in a county is therefore also associated with greater levels of foreign bias in portfolio investment. It is on the basis of this association and that of religiosity that this research studies the effects of these two measures on foreign bias.

## 8. Hypotheses

The theory for the first hypothesis of this research is drawn from the literature of cross-cultural behavioral investment biases which associates the cultural dimension of individualism/collectivism with foreign bias. BF posits and finds that greater risk-taking behavior, as manifested by higher levels of the country-level cultural dimension of individualism, is associated with higher portfolio allocations. By its converse, higher levels of collectivism are therefore also necessarily associated with lower portfolio allocations. It is on the basis of this relationship that this research associates the greater group cohesion of collectivism with religiosity and hence higher risk-aversion and lower portfolio allocations. Absent culture, Hilary and Hui (2009) use religiosity in a similar manner, using theory from

prior research on risk-aversion and religiosity to theorize that religious people are more risk averse, and that this pattern of aversion continues to the county-level, such that firms located in areas populated by risk averse people would be risk averse as well. They indeed find that greater religiosity in a county influences firms residing in that county to have lower investment rates. Following that finding, this research expects similar results for risk preferences in portfolio investment. In the context of the study of foreign bias, this will translate into lower portfolio allocations. As such, this research expects:

*Hypothesis 2. Higher religiosity in the county of domicile for funds will be associated with lower foreign portfolio allocations for those funds.*

Besides an effect from the general level of religious adherents in a given area in proportion to the total population, between-denomination variation in risk-preferences between Catholics and Protestants has been revealed in previous research (Halek and Eisenhauer 2001; Noussair, Trautmann, Van de Kuilen, and Vellekoop 2013). Within the finance literature, higher proportions of the ratio of Catholics to Protestants in a given U.S. county, or CP ratio, is associated with greater risk-taking behavior in that county (Kumar 2009, Kumar et al. 2011). Following the first hypothesis, this greater risk-taking behavior is associated with higher portfolio allocations that lead to foreign bias in portfolio investment. Therefore, this research expects:

*Hypothesis 3. Higher levels of the CP ratio in the county of domicile for funds will be associated with higher foreign portfolio allocations for those funds.*

**9. Data**

Following Hilary and Hui (2009), this study focuses its sample on the United States for the same reasons as that research. The first of these reasons is that this focus permits the study of religion and economics with lower heterogeneity among the macro-level control variables, introducing less disturbance into the model to more accurately assess the effects of religion on the variable of interest. In addition, focusing on the U.S. also permits this study to

take advantage of the higher levels of religiosity in that nation. Although the literature of behavioral investment biases at the individual investor level makes greater use of data from Scandinavian countries because of the availability of data from those nations, Hilary and Hui (2009) remarks that such countries have comparably lower levels of religious adherence than other economically developed nations, making the U.S. ideal for this study (Iannacone 1998).

Therefore, this research controls for the home market of investment by using a sample of U.S. investment funds investing in 36 host markets of investment. The 36 host markets of investment are chosen primarily because of the availability of data for market-level control variables, the variables of which are selected from BF to that research's unique focus on foreign bias to the exclusion of home bias. The list of funds was compiled using Bloomberg, using the search terms "fund domiciled in the U.S.", "fund managers located in the U.S.," "global geographic focus" and "global allocation investment strategy." This focus and strategy is necessary to compensate for the lower than average level of foreign bias for the U.S. observed by BF. Despite this focus in fund strategy, a wide variety of fund types are in the sample following Anderson et al. (2010), including REITs, small cap funds, large cap funds, short term bond funds, and other types of funds. The full sample contains monthly portfolio weightings from 475 U.S. investment funds from Q1-2006 to Q4-2015. These funds are domiciled in 133 counties in 30 states. After the formation of the fund list, all portfolio weighting and return data was collected from Morningstar Direct.

Data for the measures of religiosity and the CP ratio was obtained from the American Religious Data Archive (ARDA), which provides data on "Churches and Church Membership" for the years 1980, 1990, 2000, and 2010. Following Kumar (2009), Hilary and Hui (2009), Kumar et al. (2011), and Chen et al. (2014), linear interpolation and extrapolation is used with this data for the missing years. This data provides information on the number of Catholic and Protestant church-goers, or "adherents," for 133 counties across the U.S., as well as the populations for those counties as measured by the U.S. census bureau. Following the literature of behavioral investment biases, the location of an investment fund is defined as the location of its headquarters (Coval and Moskowitz, 1999; Ivković and Weisbenner, 2004). Investment fund street addresses were cross-checked between Bloomberg and Morningstar. Nearly two dozen discrepancies were found that were resolved by a third data source or the investment fund's web site. As such, there is reasonable assurance that investment funds have not changed

addresses during the sample time period, and if any of them have moved, the number is so low as to not introduce a significant amount of bias to the results.

## 10. Methodology

There are three measures of importance used in this analysis. The first is foreign bias, the dependent variable that is operationalized in this research in the same manner as from the research from which it originates, Chan, Covrig, and Ng (2005). The second measure is that of the independent variable of religiosity, which is operationalized in this research in the same manner as Hilary and Hui (2009). The final measure is that of the CP ratio, or ratio of Catholics to Protestants, which is operationalized in this research in the same manner as Kumar (2009).

The foreign bias measure compares the actual level of investment in a market to the optimal level of investment in that market, such that values above a one-to-one ratio of these levels are deemed to exhibit foreign bias. A logarithm transformation is taken to normalize foreign bias because only positive values of foreign bias are of interest for an analysis of over-investment. This measure is used in this research in the same manner as it is used in Chan et al. (2005), Anderson et al. (2010), and BF:

$$FBIAS_{uj} = \log\left(w_{ij} \,/\, w_j^*\right), for\ u \neq j \tag{8}$$

In this sample, *u* represents the U.S. in all cases since this analysis controls for the home country of investment using only U.S.-based investment funds, while *j* is the market capitalization of country *j* for sample *i*. The of numerator of foreign bias is represented by $w_{ij}$:

$$w_{ij} = MV_j \,/\, \sum_{j=1}^{n} MV_{ij} \tag{9}$$

which is the ratio of $MV_j$, the percentage portfolio weighting allocated to host market *j,* to the denominator, which is the total amount of investment allocated to the markets in this sample. The denominator of foreign bias $w^*_j$, $MV_j^*$, is the proportion of country market capitalization *j* to the sum of market capitalizations *j* in the sample *i*:

$$w_j^* = MV_j^* \,/\, \sum_{i=1}^{n} MV_i^* \tag{10}$$

As for the second variable of interest in this study, religiosity, this variable is constructed following Hilary and Hui (2009). Religiosity is defined as the number of religious adherents in a county in proportion to the total population of that county. The third

variable of interest, the CP ratio, is a dichotomous variable that takes a value of one if the county of fund domicile is majority-Catholic proportional to the number of Protestants in the county. The CP ratio takes a value of 0 in 2.3% of the sample, or 20,152 observations out of a sample of 1,223,388 fund-portfolio allocations in different nations. Therefore, this variable is made into an indicator variable following Kumar (2009), and this transformation ensures that the proportional imbalance between CP ratio values above and below one does not unduly affect the results of the analysis. This transformation represents a limitation of this study, however, since it conforms the coefficient to a binary version of the ratio.

The model specification for the dependent variable of foreign bias combines it with religiosity or religious closeness and several other market-level control variables, all of which are drawn from a study of foreign bias, BF. See Table 1 for a description of variables. The religious independent variables of interest are specified along with additional market-level controls within the following model specification, where the $religion_i$ variables are the measures of religiosity and the CP ratio for each county of domicile *i* from the U.S. *u* represented in the sample of U.S. investment funds. The variables of which are described in brief in table 1:

$$FBIAS_{uj} = f(HBIAS_u, Religion_{ui}, Attractiveness_j, Regional\ trade\ regime_j, Risk-return\ profile_u, Familiarity_{uj}) \quad (11)$$

Where $HBIAS_u$ is the home bias of the U.S. investment funds towards investing in the United States, *u*. Following Chan et al. (2005) and BF, this is specified as an independent variable in the model specification for foreign bias. The other control variables are drawn directly from the model specification of BF: The $Attractiveness_j$ variables measure the attractiveness of the host market of investment *j*, the $regional\ trade\ regime_j$ variables denote whether the host market in question is a member of a trade organization, the $Risk\text{-}return\ profile_j$ variables denote the level of risk present in the fund, and the $familiarity_{uj}$ variables denote whether the fund and market hold some similarity such as language or distance.

The host market *attractiveness* variables include controls for transaction costs, tax rates, host stock market development, host capital controls, and host economic growth rate as it is measured by gross domestic product. Transaction costs that are drawn from the research of Domowitz, Glen, and Madhavan (2001), and implicit costs are used because the

sample is made up of U.S. funds and also because U.S. explicit transaction costs are in decline. Tax levels are obtained from Price Waterhouse Coopers (PWC) Corporate Tax guides for each of the years in the sample. Stock market development is measured as the stock market capitalization for that market's market for that year divided by the GDP of that market for that year, and both capitalization and GDP measures are obtained from the World Bank. In certain cases, such as that of the Taiwanese market, or for certain years for the Swedish and Finnish markets, data was collected from the web sites of the relevant stock markets as well as the St. Louis Fed's FRED web site. Host market capital controls are measured using the Heritage Foundation's economic freedom index, which provides a measure of the capital controls of foreign transactions for markets on a scale of 1-100, where markets with higher scores have fewer capital restrictions. Host market economic growth is measured as the five-year lagged average GDP growth rate, where GDP data is found using available Standard & Poors data by way of the World Bank.

The *regional trade regime* variables include three dichotomous variables that separate nations that are members of the EU, NAFTA, and Asean. The *Risk-return profile* variables include the one-year and three-year lagged returns as well as the stock market volatility. Unlike the other control variables, these variables vary from the *risk-return* variables used in BF. Like that research, the one-year return is used, but unlike that research, the lagged three-year return is used instead of the lagged five-year return. This is necessary given the sample size to ensure that it remains large enough for robust results given the likelihood of funds to be liquidated or acquired over longer periods of time. The one-year and three-year returns are calculated using monthly return data following BF, the data for which is collected from Morningstar Direct. Furthermore, since this research controls for the home market of investment, a variable measuring the return correlation between home and host market investment funds is not included in this analysis due to the homogeneity that results in correlation from controlling for the home country of investment. However, a variable measuring stock market volatility differences between home and host markets is included following BF and it is measured using volatility data from WRDS and FRED.

Among the *familiarity* variables, familiarity is a dummy variable that denotes whether the host market of investment uses English as a native language. Distance is the logarithm of the great-circle distance between the center of the U.S. and the center of the host market of investment. Finally, the legal system of the host market of investment is

measured using a dummy if the nation uses a common law system, which provides greater protections to shareholders (La Porta, Lopez-de-Silanes, Shleifer, Vishny, 1998). This last variable is a dummy that indicates whether the host market uses a common law system, simplified in this research from the common law variable in BF that matches home and host markets with common law systems.

The variables in this model specification are analyzed using a left-censored tobit, following BF, and as in that research, the left-censored tobit is chosen to account for any unobserved bias in the sample resulting from focus on positive values of foreign bias, to counter any selection bias that might occur from this focus (Heckman 1979). For the same reason, following BF, for funds with no allocations for a market during a period, the observations are kept in the sample but weightings are replaced by .001. Leverage values are calculated for the sample and all but a dozen observations are kept for their individual influence on the dependent variable. Variance inflation factors are calculated as well and none of the VIF values of the variables indicate any collinearity issues.

## 11. Results

Table 6 has the summary statistics for the variables in the analysis, including the mean, median, and standard deviation. The distances of the standard deviations from the means indicates a good amount of variation in the sample except for the five-year GDP growth rate, which may be due in part to comovement between the GDP rates of nations after the sub-prime mortgage crisis. The table also has the summary statistics for the CP ratio variable before its transformation into an indicator variable. Figures 7 and 8 show the average religiosity and CP ratio values throughout the U.S. What is immediately apparent from figure 7 is the prevalence of low average CP ratios in U.S. states despite the class imbalance in that variable, likely due to the concentration of funds in states like New York and Connecticut.

Table 7 has the descriptive statistics for both the states and the host markets in the sample. Although positive values of foreign bias are the focus on this research, the average foreign bias measures for each of the 36 markets across all 10 years in the sample are all negative. Except for Finland, the same was true for the host markets of BF and this is representative of the anomalousness of foreign bias.

The main results of the tobit analysis for the base model without religiosity and the models with religious variables are shown in table 8. Following the results of Chan et al. (2005)

and BF, home bias is negatively related to foreign bias in portfolio allocations. Transaction costs, stock market development, and tax levels are all negatively related with portfolio allocations. The result for stock market development seems curious and is perhaps due to the presence of several emerging markets in this sample. The same negative signs are observed for the regional trade regimes except for NAFTA, which may be due to the membership of the U.S. in that regional trade regime. "Familiarity," the variable taking a value of one if the nation speaks English, may be positively signed for the same reason as the NAFTA variable. The risk and return variables are significant but have little economic effect. Geographical distance is positively signed and economically significant and this is perhaps due in part to the sample of global allocation funds that are chosen to counter the lower levels of foreign bias observed in the U.S. by BF. The same signs and significance levels for these control variables are present in both the model specification for religiosity and that of the CP ratio, though coefficient magnitudes vary between the specifications.

Finally, religiosity is both negatively related to foreign bias and economically significant, while the CP ratio is positively related to foreign bias and is economically significant, supporting both hypotheses of this research. Within this sample of funds, greater levels of religiosity in a county influences the risk preferences of investment funds domiciled in those counties to lower foreign portfolio allocations, and greater levels of the CP ratio in a county influences the risk preferences of investment funds domiciled in those counties to raise their foreign portfolio allocations. Both results follow the literature of risk and religiosity in the finance literature and outside of it, whereby greater religiosity is associated with a lower risk tolerance and higher levels of the CP ratio are associated with greater risk-taking.

The robustness tests mostly provide additional support for these results (see table 9). In particular, both the coefficients of the different OLS analyses as well as the coefficient found using clustered standard errors follow the main results, with the results of the clustered standard errors being most telling of the robustness of these results. These standard errors are clustered according to U.S. state, and with thirty-three different states being represented in the sample, these errors therefore absorb a considerable amount of the variance apportioned to the coefficient estimates. Despite this, the religiosity and CP ratio coefficients that are estimated using clustered standard errors remain significant. However, the fixed effects coefficients for both measures are insignificant. The fixed effects test is drawn from BF, and perhaps fixed effects are more appropriate for that study than for religion since both county

and country variation are of concern in this study. This difference perhaps makes the fixed-effects assumption of uncorrelation between the variables too excessive for this sample (2010).

As for the other robustness tests, like the model specification for the tobits, they are mostly also drawn from BF. However, some of the tests from that research are omitted here due to this research's controlling for the home market of investment. For this reason, and due to the focus in this study, robustness tests from Hilary and Hui's study of religiosity and finance are added to this research (2009). Three new tests are added as well. All of these other robustness tests either include additional control variables or use different analytic methods other than the tobit.

The first of these other robustness tests includes a variable in the model specification that proxies for institutional quality, which is added since the home market of investment, the U.S., is a highly-developed economy. The purpose for this proxy is to counter any possible omitted variable bias stemming from the disregard of differences in institutional quality between the U.S. and host markets of investment. For this test, BF uses a five-item principal component made of items for the rule of law, public enforcement of the rule of law for shareholders, the level of insider trading, risk of expropriation of funds, and financial system efficiency. These items are drawn from La Porta et al. (2007) and Djankov et al. (2008). Since it is impossible to recreate a principal component, this research instead creates an indexed measure of these five items from those studies. The result for religiosity remains robust to the inclusion of this measure but the result for the CP ratio does not. The results for the CP ratio are weaker overall in the robustness tests, no doubt due to the indicator nature of the variable and the extreme class imbalance of the variable that will not withstand robustness tests as easily as religiosity.

As for the other robustness tests, OLS tests with and without the zero values included (zero-truncation instead of left-censoring at zero) are also conducted, as well as OLS with the Heckman adjustment to counter any potential sample selection bias. The robust result for the Heckman adjustment with the religiosity result is relevant because this sample is composed of global allocation funds that are chosen to counter a lower than average level of foreign bias present in the U.S. that was observed by BF. The sign and significance remain unchanged for both measures with the Heckman test. A probit is also estimated and the sign and significance of religiosity changes, signaling that the main results for religiosity rely more upon the variation in positive values of foreign bias than upon the proportion of positive values of

foreign bias to left-censored values. This reliance on variation within the dependent variable makes the religious decomposition robustness tests of greater interest and importance. Perhaps unsurprisingly, given the proportional class imbalance of the CP ratio, the probit results for this variable are not significant.

In addition, due to the simplification of the familiarity (common language) variable from BF in this sample of U.S. investment funds, a robustness test that adds the future-time reference of the language of the host market is conducted. This variable takes a dichotomous form denoting a match between the strong or weak future-time reference of the U.S.'s main language of English (strong) and the future-time reference of the country of investment's native language. Strong future-time referent languages distinctly denote the times of events while weak future-time reference languages do not. Such differences could bear on perceptions of risk if the immediacy of risk is more apparent in a language with a strong future-time reference. This variable controls for differences in how different cultures perceive time, and the results are robust to the inclusion of this variable (Chen 2013).

In addition to language, because religiosity is associated with risk-taking and portfolio allocations following prior theory associating the cultural dimension of individualism/collectivism and portfolio allocations, a state-level measure of collectivism from Vandello and Cohen (1999) is used to control for any effects of this cultural dimension. Their research finds state-level collectivism scores in all 50 states on a percentile scale. This measure is used to isolate any effects due to differences in collectivism across states from the effects of religiosity on risk-taking in portfolio allocations. The results for religiosity and the CP ratio are both robust against the inclusion of this variable, though it should be noted that the highest-individualism northern midwestern states are absent from the sample. Finally, to complement that test, another test is conducted that includes the cultural distance index of Kogut and Singh (1988). This index measures the difference between the U.S. and the nation of investment on all four of Hofstede's main cultural dimensions, and the results are robust to the inclusion of this variable as well.

Because this study of foreign bias concerns religion, some robustness tests have also been drawn from that stream of literature from Hilary and Hui (2009). The first of these tests uses a sub-sample of western states, a test conducted due to the "geographical homogeneity and religious heterogeneity" of the region. Though Hilary and Hui (2009) uses seven states in their western state sub-sample (Arizona, California, Idaho, Nevada, Oregon, Utah, and

Washington), only four of those states are present in this sample. Though the signs of both coefficients remain unchanged, neither is statistically significant, likely due to the smaller representation of western states in this sample.

The next test is reserved only for the measure of religiosity and considers differences between religious denominations. Two variables are separated from the *religiosity* variable: one ratio of Protestants to the total county population, and one ratio of Catholics to the total county population. The coefficient for Protestants is positive though barely significant ($p < .1$), weakly countering the results of Hilary and Hui (2009) for corporate risk aversion but supporting the association Weber makes between "the Protestant work ethic and growth" mindset, at least as growth applies to increased portfolio allocations (Iannaccone, 1998). For Catholics, however, this test is negative and significant. This result is contrary to theory that Catholics are risk-tolerant, at least for portfolio investment (Barsky, Juster, Kimball, and Shapiro 1997). The conflicting signs for both of the religiosity decomposition tests may also an alternative explanation for the relative weakness of the robustness tests for the CP ratio besides the class imbalance in that variable.

Such an explanation would indicate the possibility the within-denomination risk tolerances, at least as they regard portfolio investment, have been changing to counter what prior theory on risk would suggest. A similar effect has been observed in culture, where a curvilinear relationship between national wealth (GDP/capita) and national culture has been observed to have occurred in the intervening decades between the original measurements of Hofstede's cultural dimensions and the present (Tang and Koveos, 2008). Another possibility is that the risk preferences of Catholics and/or Protestants are multidimensional and apply differently to portfolio investment than to other financial transactions, such as the IRR rate of capital investment projects studied in Hilary and Hui (2009). Indeed, Halek and Eisenhauer's study of risk aversion and insurance, which calculates Arrow-Pratt coefficients for differing types of risk aversion and religions, finds that Catholics are risk averse (2001). Unfortunately, due to data limitations, similar Arrow-Pratt calculations are not possible in this research.

In summary, although it seems that there seems to be an effect of religiosity on portfolio allocations, the variation of the dichotomous variable for the CP ratio may not be enough to capture the exact magnitude of that relationship. Despite this, the positive results for several of the robustness tests indicate an effect. If these signs of the religiosity decomposition tests are accepted, however, they provide an alternative reason for the CP ratio results and also

contradict prior theory on the risk preferences of Catholics. For the reasons mentioned above, this change in risk preference is entirely plausible, though the reasons for such a change are beyond the scope of this study.

## 12. Conclusions

The presence of foreign bias in portfolio investment is an anomaly compared with home bias, and explanations for this bias have begun to emerge in the literature. By associating prior theory linking culture to foreign bias with religion and substantiating that association with other research on religion and risk-taking in finance from Hilary and Hui (2009), this study has been able to make tentative connections between religion and foreign bias in portfolio investment that have received empirical support in the course of hypothesis testing. As with any study, however, as many questions are raised in the process of this testing as are resolved.

In particular, the decomposition of the religiosity variable into ratios of Catholics or Protestants to total population revealed interesting relationships that contradict prior findings on the risk tolerances of each denomination. It is simple to explain away these results as effects of risk tolerance differences for portfolio allocation, but further examination is warranted by these results. Though the reason for this relationship is beyond the scope of this research, it indicates that there is research yet to be conducted on the effects of religion on finance. Aside from that question, there is the matter of the magnitude of the effect of a positive CP ratio on portfolio allocations. Although a positive effect was found, the proportional class imbalance in this sample made it necessary to use a dichotomous version of this measure that removed the variation that would have given a more accurate estimate of the exact magnitude of that effect.

Otherwise, the results of this research indicate the religion does indeed have an effect on portfolio allocations. For managed investment funds, an awareness of the potential of religion to affect the investment decisions could be an important factor in adjusting allocations to remove its influence. Such adjustments, as they continue to be suggested by the literature in this area, will continue to refine the investment strategies of managed funds to give them an advantage over their passive competitors in the form of the “self-awareness” that Morgan Stanley’s Dennis Lynch refers to in his interview. Perhaps capital will then begin to flow away

from comparably “unaware” passive investment funds back towards managed funds.

## APPENDICES

**Appendix A - Table 1. Variable Descriptions for part 1 and 2**

| | Source | Description |
|---|---|---|
| Foreign Bias | Morningstar Direct | log-difference in weighting of country in proportion to portfolio vs. market capitalization of country in proportion to market capitalization of portfolio |
| Home Bias | Morningstar Direct | log-difference in weighting of the U.S. in proportion to portfolio vs. market capitalization of U.S. in proportion to market capitalization of portfolio |
| Transaction Costs | Djankov et al. (2008) | Implicit transaction costs for the host country of investment |
| Capital Controls | Heritage Foundation | Economic freedom index |
| Market Development | World Bank | Stock market capitalization/GDP growth rate |
| Tax Levels | PWC Tax Tables | Highest-bracket corporate tax rate |
| GDP Growth | World Bank | Five-year average GDP rate of change |
| EU indicator | | Binary variable that takes a value of one if the country is a member of the EU, zero otherwise |
| NAFTA indicator | | Binary variable that takes a value of one if the country is a member of NAFTA, zero otherwise |
| Asean indicator | | Binary variable that takes a value of one if the country is a member of ASEAN, zero otherwise |
| Stock Market Volatility | St. Louis FRED | Volatility of the stock market for the past year |
| Common Language | | Binary variable that takes a value of one if the country speaks English as its main language |

**Appendix A – Table 1. (cont.) Variable Descriptions for parts 1 and 2**

| | Source | Description |
|---|---|---|
| Common Law | La Porta et al. (1998) | Binary variable that takes a value of one if the country has a common law system, zero otherwise |
| Geographic Distance | | Log of the great-circle distance between the center of the U.S. and the center of the host investment country in kilometers |
| One-year return | St. Louis FRED | Lagged one-year average return calculated using monthly data |
| Three-year return | St. Louis FRED | Lagged three-year average return calculated using monthly data |
| Cultural Distance | Kogut and Singh (1988) | Mahalanobis cultural distance between the U.S. and the host country of investment |
| Religiosity | ARDA | Ratio of adherents to the population for the U.S. county where the investment fund is domiciled. |
| CP Ratio | ARDA | Ratio of Catholics to Protestants for the U.S. county where the investment fund is domiciled. |

**Appendix B - Table 2. Summary Statistics of parts 1 and 2**

| | Mean | Median | Standard Deviation |
|---|---|---|---|
| Foreign Bias | -1.51 | -1.33 | 1.1 |
| Home Bias | 0.222 | 0.258 | 0.161 |
| Transaction Costs | 24 | 15.4 | 24.4 |
| Capital Controls | 69.8 | 70.2 | 9.15 |
| Market Development | 1.011 | 0.67 | 1.60 |
| Tax Levels | 26.08 | 27.5 | 6.73 |
| GDP Growth | 2.437 | 2.34 | 2.33 |
| EU indicator | 0.444 | 0 | 0.497 |
| NAFTA indicator | 0.056 | 0 | 0.229 |
| Asean indicator | 0.083 | 0 | 0.276 |
| Stock Market Volatility | 33.3 | 9.48 | 105.1 |
| Common Language | 0.167 | 0 | 0.373 |
| Common Law | 0.278 | 0 | 0.448 |
| Lag one-year return | 7.61 | 7.50 | 17.7 |
| Lag three-year return | 27 | 25.5 | 33.8 |
| Cultural Distance | 2.45 | 2.59 | 1.01 |
| Religiosity | 0.58 | 0.57 | 0.14 |
| CP Ratio | 16.56 | 15.24 | 14.58 |

## Appendix C - Table 3. Descriptive statistics for host markets in Part 1

| | Optimal Weights | Avg. Allocation | Avg. Foreign Bias | Cultural Distance from U.S. to host |
|---|---|---|---|---|
| Argentina* | 0.10 | 0.02 | -1.14 | 2.42 |
| Australia | 2.59 | 0.99 | -0.56 | 0.23 |
| Austria | 0.26 | 0.09 | -0.52 | 2.33 |
| Belgium | 0.63 | 0.17 | -0.72 | 2.36 |
| Brazil* | 2.36 | 0.58 | -0.69 | 2.81 |
| Canada | 3.97 | 2.01 | -0.37 | 0.69 |
| Colombia* | 0.35 | 0.01 | -1.92 | 3.53 |
| Czech Republic | 0.11 | 0.02 | -0.86 | 1.89 |
| Denmark | 0.48 | 0.22 | -0.54 | 2.87 |
| Finland | 0.41 | 0.21 | -0.32 | 2.28 |
| France | 4.23 | 1.70 | -0.47 | 2.41 |
| Germany | 3.23 | 1.29 | -0.49 | 1.24 |
| Greece* | 0.21 | 0.06 | -0.67 | 3.55 |
| Hong Kong | 4.87 | 0.81 | -0.84 | 2.95 |
| Hungary* | 0.06 | 0.01 | -0.79 | 2.06 |
| India* | 2.59 | 0.24 | -1.14 | 2.40 |
| Ireland | 0.23 | 0.20 | -0.24 | 1.12 |
| Italy | 1.36 | 0.48 | -0.54 | 1.44 |
| Japan | 8.17 | 2.79 | -0.53 | 3.15 |
| Malaysia* | 0.78 | 0.07 | -1.19 | 3.92 |
| Mexico* | 0.89 | 0.23 | -0.67 | 3.36 |
| Netherlands | 1.42 | 0.63 | -0.43 | 2.60 |
| New Zealand | 0.10 | 0.04 | -0.65 | 0.97 |
| Norway | 0.53 | 0.36 | -0.22 | 3.02 |
| Philippines* | 0.33 | 0.06 | -0.93 | 3.36 |
| Portugal | 0.17 | 0.03 | -0.84 | 3.92 |
| Singapore | 1.16 | 0.40 | -0.59 | 3.58 |
| South Africa* | 1.67 | 0.20 | -1.03 | 1.09 |
| South Korea | 2.10 | 0.35 | -0.84 | 3.57 |
| Spain | 2.52 | 0.39 | -0.77 | 2.59 |
| Sweden | 1.05 | 0.44 | -0.45 | 3.22 |
| Switzerland | 2.55 | 1.33 | -0.32 | 1.13 |
| Taiwan | 1.11 | 0.32 | -0.08 | 3.25 |

* non-“high income” countries as defined by the World Economic Forum

**Appendix C - Table 3. (cont.) Descriptive statistics for host markets in Part 1**

| | Optimal Weights | Avg. Allocation | Avg. Foreign Bias | Cultural Distance from U.S. to host |
|---|---|---|---|---|
| Thailand* | 0.56 | 0.07 | -0.98 | 3.39 |
| Turkey* | 0.49 | 0.08 | -0.95 | 3.00 |
| U.K. | 6.11 | 3.64 | -0.26 | 0.55 |

* non-"high income" countries as defined by the World Economic Forum

## Appendix D - Table 4. Descriptive statistics for states and host markets in Part 2

| | Avg. Allocation | Avg. Foreign Bias | | Optimal Weights | Avg. Allocation | Avg. Foreign Bias |
|---|---|---|---|---|---|---|
| Arizona* | 0.41 | -0.65 | Argentina | 0.10 | 0.02 | -1.14 |
| California* | 0.33 | -0.65 | Australia | 2.59 | 0.99 | -0.56 |
| Colorado | 0.43 | -0.65 | Austria | 0.26 | 0.09 | -0.52 |
| Connecticut | 0.53 | -0.65 | Belgium | 0.63 | 0.17 | -0.72 |
| D.C. | 0.70 | -0.72 | Brazil | 2.36 | 0.58 | -0.69 |
| Delaware | 0.69 | -0.66 | Canada | 3.97 | 2.01 | -0.37 |
| Florida | 0.54 | -0.70 | Colombia | 0.35 | 0.01 | -1.92 |
| Georgia | 0.42 | -0.64 | Czech Republic | 0.11 | 0.02 | -0.86 |
| Iowa | 1.10 | -0.54 | Denmark | 0.48 | 0.22 | -0.54 |
| Illinois | 0.75 | -0.60 | Finland | 0.41 | 0.21 | -0.32 |
| Kansas | 0.49 | -0.68 | France | 4.23 | 1.70 | -0.47 |
| Massachusetts | 0.69 | -0.65 | Germany | 3.23 | 1.29 | -0.49 |
| Maryland | 0.38 | -0.62 | Greece | 0.21 | 0.06 | -0.67 |
| Maine | 0.49 | -0.70 | Hong Kong | 4.87 | 0.81 | -0.84 |
| Missouri | 0.38 | -0.60 | Hungary | 0.06 | 0.01 | -0.79 |
| North Carolina | 0.68 | -0.63 | India | 2.59 | 0.24 | -1.14 |
| Nebraska | 0.24 | -0.53 | Ireland | 0.23 | 0.20 | -0.24 |
| New Hampshire | 0.24 | -0.63 | Italy | 1.36 | 0.48 | -0.54 |
| New Jersey | 0.34 | -0.64 | Japan | 8.17 | 2.79 | -0.53 |
| New Mexico | 0.43 | -0.67 | Malaysia | 0.78 | 0.07 | -1.19 |
| New York | 1.30 | -0.58 | Mexico | 0.89 | 0.23 | -0.67 |
| Ohio | 0.53 | -0.64 | Netherlands | 1.42 | 0.63 | -0.43 |
| Pennsylvania | 0.88 | -0.54 | New Zealand | 0.10 | 0.04 | -0.65 |
| Rhode Island | 0.79 | -0.63 | Norway | 0.53 | 0.36 | -0.22 |
| Tennessee | 0.55 | -0.68 | Philippines | 0.33 | 0.06 | -0.93 |
| Texas | 1.72 | -0.39 | Portugal | 0.17 | 0.03 | -0.84 |
| Utah* | 0.47 | -0.66 | Singapore | 1.16 | 0.40 | -0.59 |
| Virginia | 0.43 | -0.53 | South Africa | 1.67 | 0.20 | -1.03 |
| Washington* | 0.23 | -0.68 | South Korea | 2.10 | 0.35 | -0.84 |
| Wisconsin | 0.97 | -0.62 | | | | |

* Part of western state sub-sample (Hilary and Hui 2009)

## Appendix E - Table 5. Main specification results for part 1

Dependent variable is foreign bias as defined in the methodology section. Table has left-censored tobit regression results with heteroskedastic-robust standard errors in parentheses. Numbers in parentheses are heteroskedastic-robust standard errors. ***, **, and * denote statistical significance at the 0.001, 0.01, and 0.5 levels, respectively. The sample is from January 2006 to December 2015.

| Independent variables | Base Model | with Cultural Distance | Developed host nations only | Developing host nations only |
|---|---|---|---|---|
| Home bias | -0.044***<br>(0.001) | -0.045***<br>(0.001) | -2.33***<br>(0.018) | -0.004***<br>(0.000) |
| Transaction costs | -0.001***<br>(0.000) | -0.001***<br>(0.000) | -0.018***<br>(0.000) | -0.000***<br>(0.000) |
| Capital controls | -0.000***<br>(0.000) | 0.000***<br>(0.000) | -0.047***<br>(0.001) | -0.000***<br>(0.000) |
| Stock market dev't | -0.013***<br>(0.000) | -0.014***<br>(0.000) | -0.913***<br>(0.006) | -0.001***<br>(0.000) |
| Tax levels | -0.004***<br>(0.000) | -0.004***<br>(0.000) | -0.073***<br>(0.000) | -0.000<br>(0.000) |
| Five-year avg. GDP rate | 0.007***<br>(0.001) | 0.008***<br>(0.000) | 0.138***<br>(0.001) | 0.001***<br>(0.000) |
| Host is EU | -0.009***<br>(0.000) | 0.002***<br>(0.000) | -0.736***<br>(0.006) | ‡ |
| Host is NAFTA | 0.099***<br>(0.002)] | 0.111***<br>(0.002) | -0.476***<br>(0.015) | -0.003***<br>(0.00) |
| Host is Asean | -0.071***<br>(0.000) | -0.096***<br>(0.001) | -2.63***<br>(0.022) | -0.003***<br>(0.000) |
| Lagged one-year return | 0.000***<br>(0.000) | 0.002***<br>(0.000) | 0.002***<br>(0.000) | -0.000***<br>(0.000) |
| Lagged three-year return | 0.000***<br>(0.000) | 0.000***<br>(0.000) | 0.002***<br>(0.000) | 0.000<br>(0.000) |
| Stock market volatility | 0.000***<br>(0.000) | 0.000<br>(0.000) | -0.000***<br>(0.000) | 0.000***<br>(0.000) |
| Common language | 0.009***<br>(0.000) | 0.056***<br>(0.001) | 0.267***<br>(0.016) | 0.007***<br>(0.001) |
| Shared common law | -0.030***<br>(0.000) | -0.032***<br>(0.001) | 0.000<br>(0.000) | 0.002***<br>(0.000) |
| Geographic distance | 0.061***<br>(0.001) | 0.069***<br>(0.001) | -0.856***<br>(0.007) | -0.003***<br>(0.000) |
| Cultural Distance | | 0.024***<br>(0.001) | 0.050**<br>(0.002) | 0.001**<br>(0.000) |
| N (number of left-censored observations) | 56932<br>(1166456) | 56932<br>(1166456) | 55512<br>(828046) | 1441 (338410) |
| Chi-squared | 13188.01***<br>* | 14535.61***<br>* | 60425.40*** | 772.91*** |
| Log likelihood | -1435580.7 | -1432096.9 | -104476.56 | -404498.01 |

‡ = dummy variable omitted due to lack of representation in sub-sample

**Appendix F - Table 6. Alternative specification results for part 1**

| Independent variables | Base Model | with Cultural Distance | Developed host nations only | Developing host nations only |
|---|---|---|---|---|
| Home bias | 3.94*** (0.032) | 3.97*** (0.032) | 4.15*** (0.031) | 0.007*** (0.000) |
| Credit* | 0.065*** (0.000) | 0.067*** (0.000) | 0.064*** (0.000) | 0.000** (0.000) |
| FDI/GDP* | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | -0.000 (0.000) |
| GDP(%)* | 0.002** (0.000) | -0.010*** (0.000) | -0.014*** (0.000) | -0.001*** (0.000) |
| GDP/capita* | 1.31*** (0.012) | 1.29*** (0.012) | -0.189*** (0.021) | 0.001*** (0.000) |
| Trade balance/GDP* | -0.024*** (0.000) | -0.023*** (0.000) | -0.000 (0.000) | 0.000*** (0.000) |
| Transaction costs | 0.005*** (0.000) | 0.004*** (0.000) | -0.017*** (0.000) | -0.000* (0.000) |
| Capital controls | -0.113*** (0.001) | -0.111*** (0.001) | -0.108*** (0.001) | 0.000*** (0.000) |
| Stock market dev't | -2.82*** (0.016) | -2.66*** (0.016) | -2.48*** (0.007) | 0.000 (0.000) |
| Tax levels | -0.279*** (0.001) | -0.275*** (0.001) | -0.240*** (0.001) | 0.000 (0.000) |
| Five-year avg. GDP rate | 0.231*** (0.002) | 0.240*** (0.002) | 0.297*** (0.001) | 0.002*** (0.000) |
| Host is EU | 0.054*** (0.010) | 0.150*** (0.010) | -0.786*** (0.017) | ‡ |
| Host is NAFTA | 1.01*** (0.045) | 1.33*** (0.047) | -1.87*** (0.063) | -0.014*** (0.002) |
| Host is Asean | 0.211*** (0.049) | 0.089* (0.042) | -7.41*** (0.044) | 0.005** (0.001) |
| Lagged one-year return | 0.002*** (0.000) | 0.003*** (0.000) | 0.005*** (0.000) | -0.000*** (0.000) |
| Lagged three-year return | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.000* (0.000) |
| Stock market volatility | 0.001*** (0.000) | 0.000*** (0.000) | -0.002*** (0.000) | 0.000*** (0.000) |
| Common language | 2.58*** (0.054) | 2.74*** (0.047) | -7.4*** (0.075) | -0.028*** (0.005) |
| Shared common law | -1.47*** (0.049) | -1.29*** (0.042) | 8.71*** (0.075) | -0.003* (0.001) |
| Geographic distance | -0.947*** (0.020) | -0.701*** (0.021) | -2.95*** (0.042) | -0.011*** (0.001) |
| Cultural Distance | | 0.248*** (0.005) | 0.230*** (0.005) | -0.018*** (0.002) |
| N (number of left-censored observations) | 56932 (1166456) | 56932 (1166456) | 55512 (828046) | 1420 (338410) |
| Chi-squared | 71507.62*** | 69901.72*** | 63489.99*** | 787.83*** |
| Log likelihood | -139768.99 | -138953.87 | -126063.38 | -410275.2 |

**Appendix G - Table 7. Robustness tests for the alternative specification in part 1**

| | Combined portfolio | Developed markets | Developing markets |
|---|---|---|---|
| *Panel A: Cultural Distance coefficients* | | | |
| Main results from Table 4 | 0.248***<br>(0.005) | 0.230***<br>(0.005) | -0.018***<br>(0.002) |
| Updated Hofstede scores (Tang and Koveos 2008) | 0.007***<br>(0.000) | 0.137***<br>(0.004) | 0.000<br>(0.000) |
| Home and host mixed effects | 0.059 ·<br>(0.032) | .055*<br>(0.027) | -0.018<br>(0.026) |
| OLS – zero-values excluded | 0.102***<br>(0.007) | 0.190***<br>(0.008) | ‡ |
| OLS – with Heckman | 0.067***<br>(0.000) | 0.068***<br>(0.000) | -0.018***<br>(0.001) |
| OLS – without Heckman | 0.067***<br>(0.000) | 0.068***<br>(0.000) | -0.018***<br>(0.001) |
| Probit | 0.237***<br>(0.005) | 0.279***<br>(0.005) | ‡ |
| Future-time reference | 0.063***<br>(0.000) | 0.075***<br>(0.006) | -0.033***<br>(0.004) |
| Institutional quality | 0.283***<br>(0.005) | 0.211***<br>(0.005) | -0.014***<br>(0.002) |
| *Panel B : Coefficients of individual institutional quality components* | | | |
| Efficiency | 0.008***<br>(0.004) | 1.90***<br>(0.021) | 0.101***<br>(0.047) |
| Rule of law | -0.006***<br>(0.000) | -1.30***<br>(0.032) | -0.262***<br>(0.036) |
| Corruption | -0.045***<br>(0.000) | 0.061*<br>(0.027) | 0.148***<br>(0.017) |
| Expropriation | -0.087***<br>(0.002) | 3.74***<br>(0.078) | ‡ |
| Contract law | 0.120***<br>(0.001) | -2.00***<br>(0.061) | ‡ |
| *Panel C: Coefficients of individual cultural distance component dimensions* | | | |
| Abs. difference - power distance | -0.002***<br>(0.000) | -0.015***<br>(0.001) | -0.003***<br>(0.000) |
| Abs. difference – individualism | -0.005***<br>(0.000) | -0.006***<br>(0.000) | -0.003***<br>(0.000) |
| Abs. difference – masculinity | -0.001***<br>(0.000) | 0.022***<br>(0.000) | 0.007***<br>(0.001) |
| Abs. difference – uncertainty avoidance | -0.000***<br>(0.000) | 0.001 ·<br>(0.000) | ‡ |

‡ = variable omitted due to collinearity

**Appendix H - Table 8. Main results for Part 2**

| Independent variables | Base Model | Base Model with Religiosity | Base Model with CP Ratio |
|---|---|---|---|
| Home bias | -0.044***<br>(0.001) | 0.043***<br>(0.001) | 0.092***<br>(0.002) |
| Transaction costs | -0.001***<br>(0.000) | -0.001***<br>(0.000) | -0.001***<br>(0.000) |
| Capital controls | -0.000***<br>(0.000) | 0.000***<br>(0.000) | 0.000***<br>(0.000) |
| Stock market dev't | -0.013***<br>(0.000) | -0.013***<br>(0.000) | -0.031***<br>(0.000) |
| Tax levels | -0.004***<br>(0.000) | -0.004***<br>(0.000) | -0.009***<br>(0.000) |
| Five-year avg. GDP rate | 0.007***<br>(0.001) | 0.007***<br>(0.000) | 0.016***<br>(0.000) |
| Host is EU | -0.009***<br>(0.000) | -0.008***<br>(0.000) | -0.021***<br>(0.001) |
| Host is NAFTA | 0.099***<br>(0.002)] | 0.099***<br>(0.002) | 0.228***<br>(0.004) |
| Host is Asean | -0.071***<br>(0.000) | -0.071***<br>(0.001) | -0.163***<br>(0.002) |
| Lagged one-year return | 0.000***<br>(0.000) | 0.000***<br>(0.000) | 0.000***<br>(0.000) |
| Lagged three-year return | 0.000***<br>(0.000) | 0.000***<br>(0.000) | 0.000***<br>(0.000) |
| Stock market volatility | 0.000***<br>(0.000) | 0.000***<br>(0.000) | 0.000***<br>(0.000) |
| Common language | 0.009***<br>(0.000) | 0.009***<br>(0.000) | 0.021***<br>(0.002) |
| Shared common law | -0.030***<br>(0.000) | -0.030***<br>(0.000) | -0.067***<br>(0.002) |
| Geographic distance | 0.061***<br>(0.001) | 0.061***<br>(0.001) | 0.139***<br>(0.002) |
| Religiosity | | -0.014***<br>(0.001) | |
| CP Ratio | | | 0.008**<br>(0.003) |
| N (number of left-censored observations) | 56932 (1166456) | 56932 (1166456) | 56932 (1166456) |
| Chi-squared | 13188.01*** | 13196.22*** | 13103.00*** |
| Log likelihood | -1435580.7 | -1435555.7 | -1483054.6 |

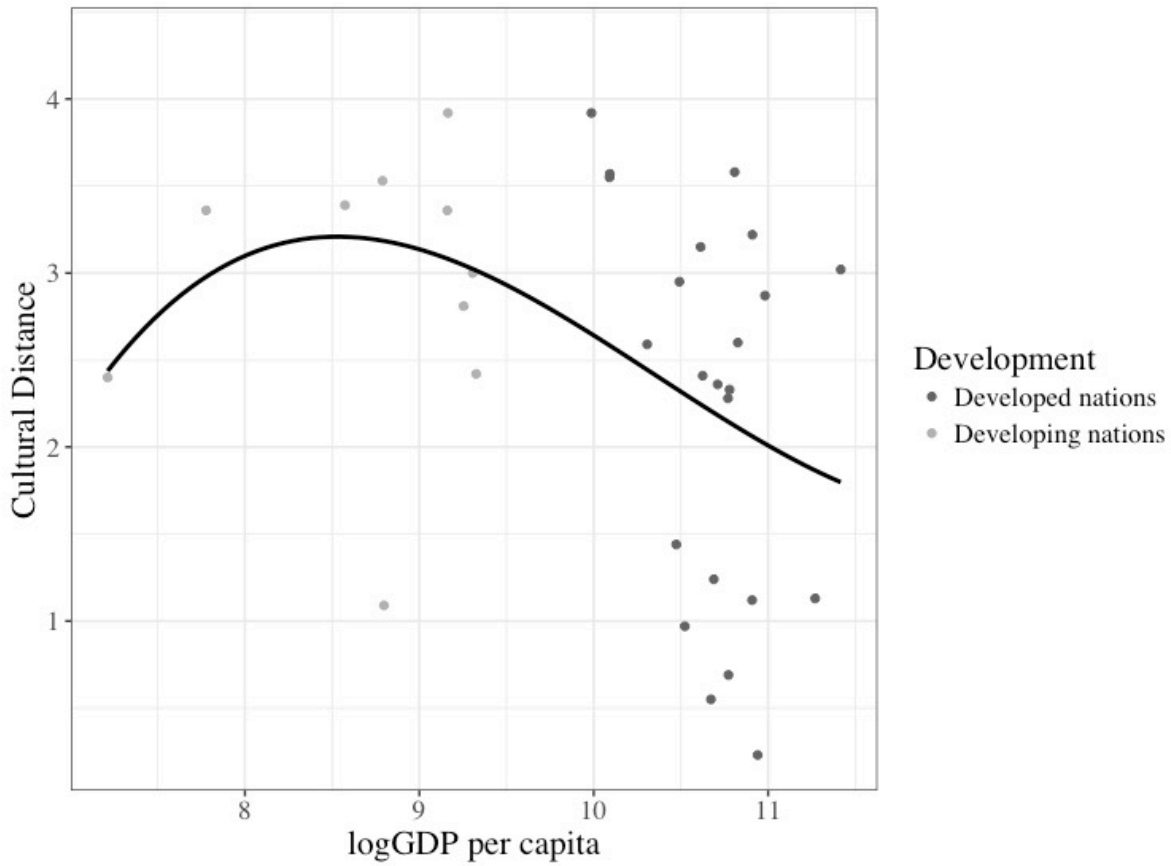
## Appendix I - Table 9. Robustness tests for part 2

Robustness tests on foreign bias with modified specifications for religiosity and the CP ratio. Panel A adds additional variables to the main specifications, panel B uses alternative models, and Panel C uses religion-based sub-samples. Dependent variable is foreign bias as defined in the methodology section (log ratio of weighting of country i in fund holdings of host country j to the stock market capitalization weighting of country j). Table has left-censored Tobit regression results with heteroskedastic-robust standard errors in parentheses. If a fund had zero market share for a country in a month of the time-series, the left-censored observations are the log of 0.001. ***, **, and * denote statistical significance at the 0.001, 0.01, and 0.1 levels, respectively. The sample is from January 2006 to December 2015.

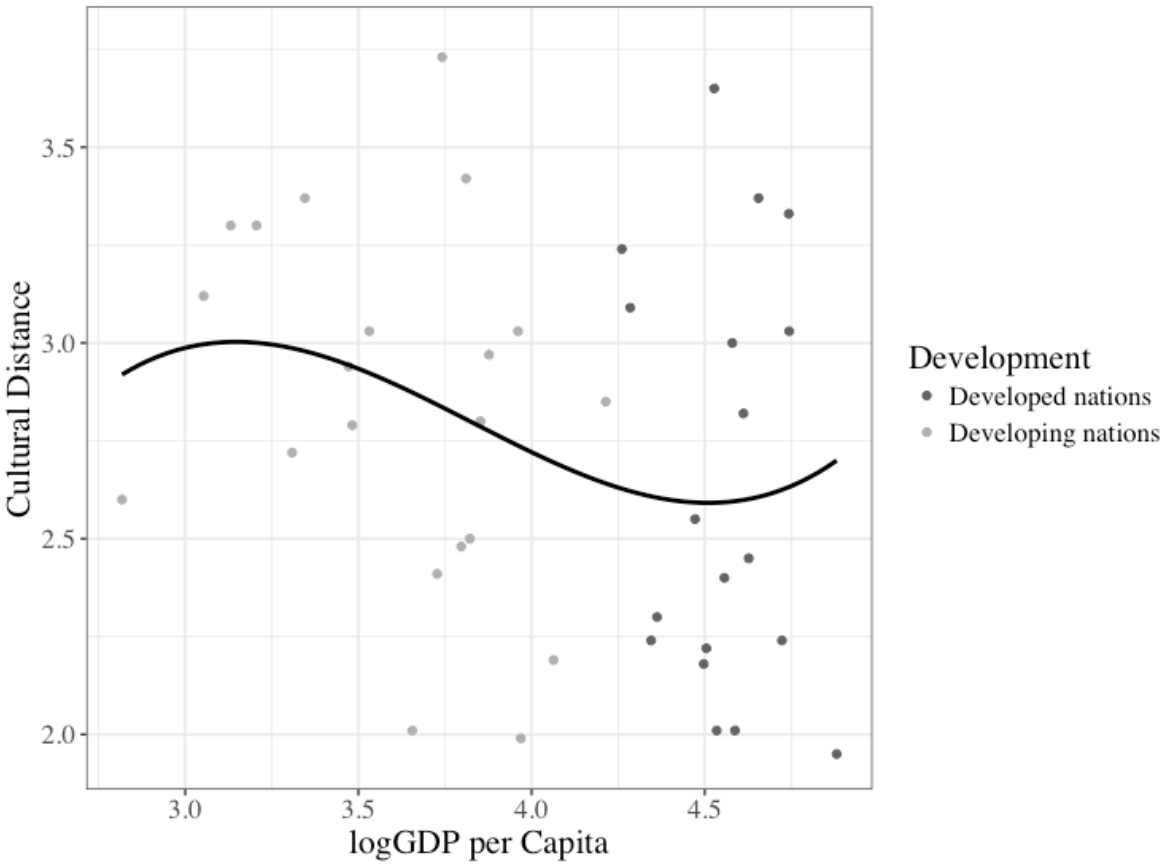
| | Religiosity | CP Ratio |
|---|---|---|
| Main results from Table 4 | -0.014***<br>(0.001) | 0.008**<br>(0.003) |
| Institutional quality | -0.016***<br>(0.001) | 0.041<br>(0.27) |
| Future-time reference | -0.199***<br>(0.012) | -0.053*<br>(0.028) |
| State-level collectivism | -0.016***<br>(0.001) | 0.009**<br>(0.003) |
| Cultural Distance | -0.036***<br>(0.003) | 0.009**<br>(0.003) |
| *Alternative analytic methods* | | |
| Clustered standard errors | -0.288**<br>(0.139) | 0.008***<br>(0.001) |
| Home and host country fixed effects | 0.000<br>(0.000) | -0.000<br>(0.000) |
| Probit | 0.120***<br>(0.023) | 0.003<br>(0.019) |
| OLS with Heckman control | -0.014***<br>(0.001) | 0.008***<br>(0.001) |
| OLS without Heckman control | -0.014***<br>(0.001) | 0.008***<br>(0.001) |
| OLS with zeros excluded | -0.071***<br>(0.009) | 0.009<br>(0.022) |
| *Sub-sample and decomposition* | | |
| Western state sub-sample | -0.048<br>(0.051) | ‡ |
| Religiosity decomposition: | | |
| Protestants only | 0.004*<br>(0.002) | - |
| Catholics only | -0.006***<br>(0.001) | - |

‡ entire Western state sub-sample had CP ratio higher than one.

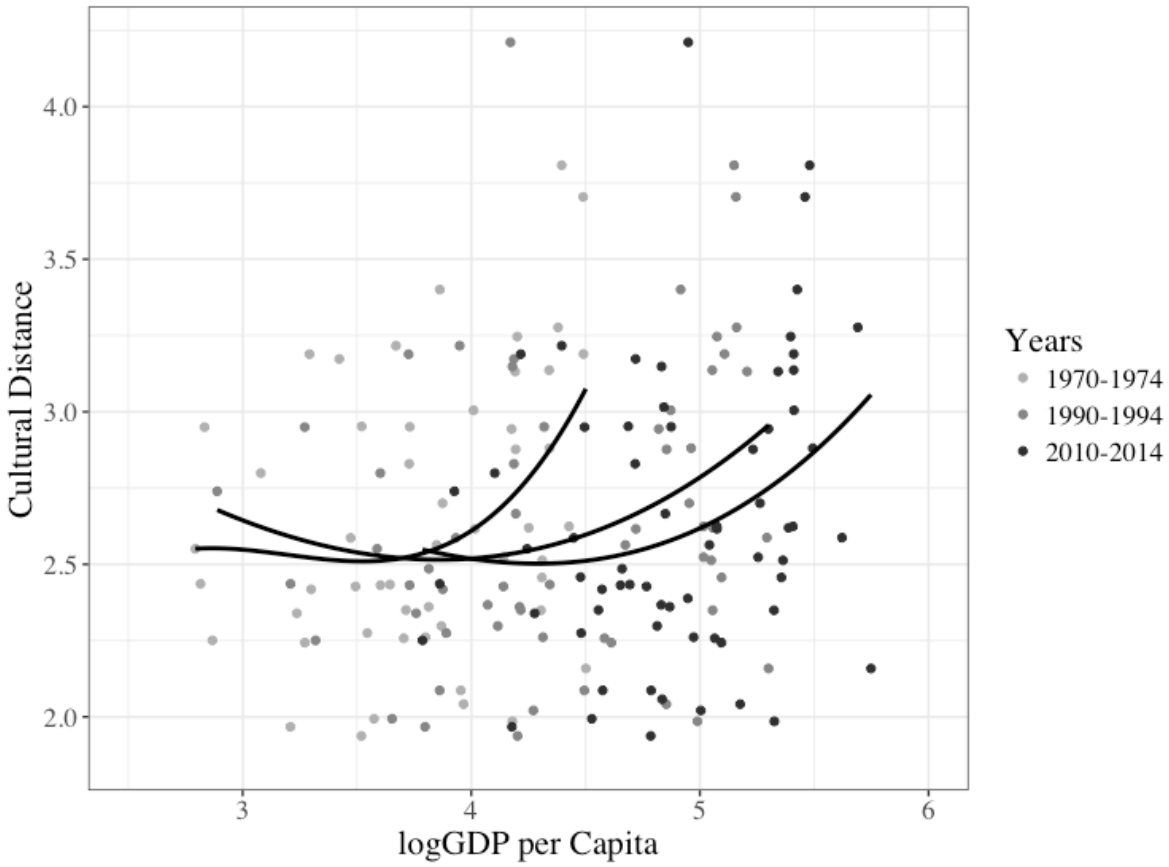
**Appendix J - Figure 1. Cultural distance and GDP/capita (sample)**



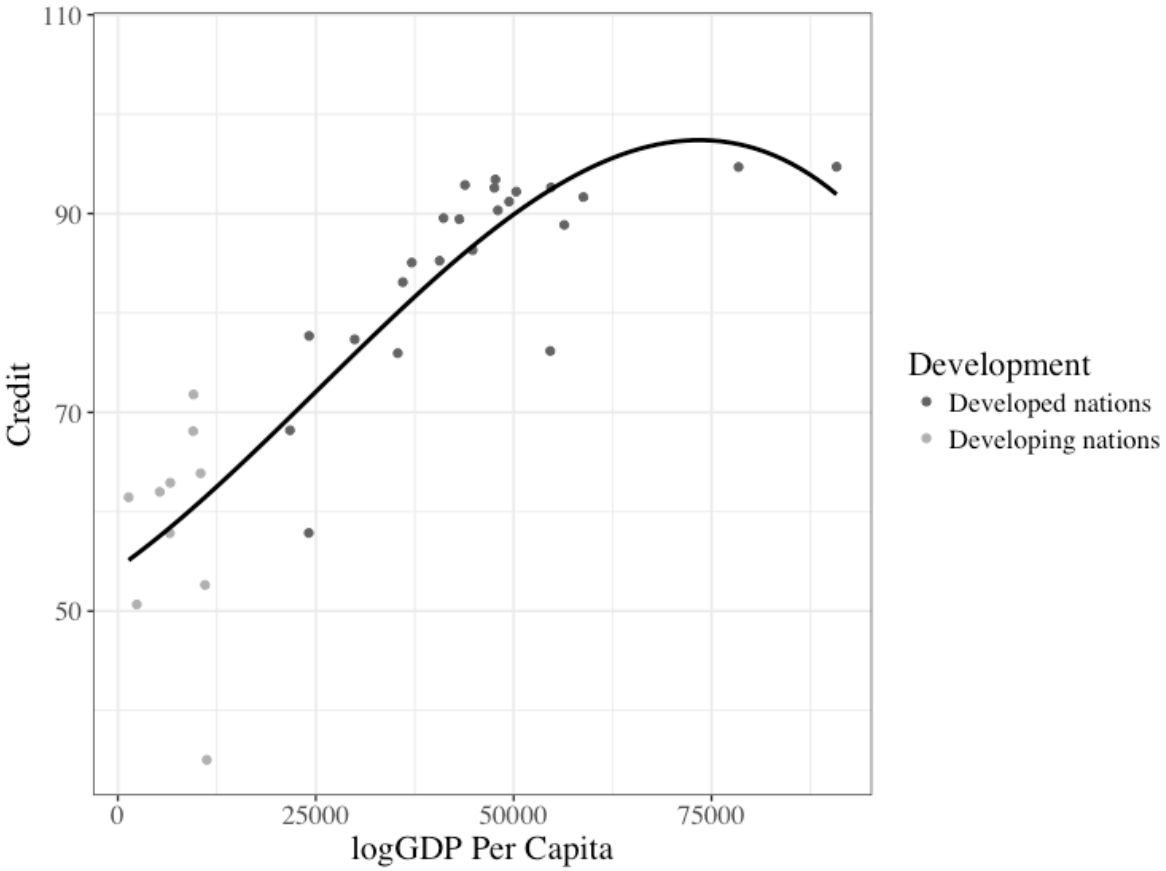
**Appendix K – Figure 2. Cultural distance and GDP/capita (BF)**



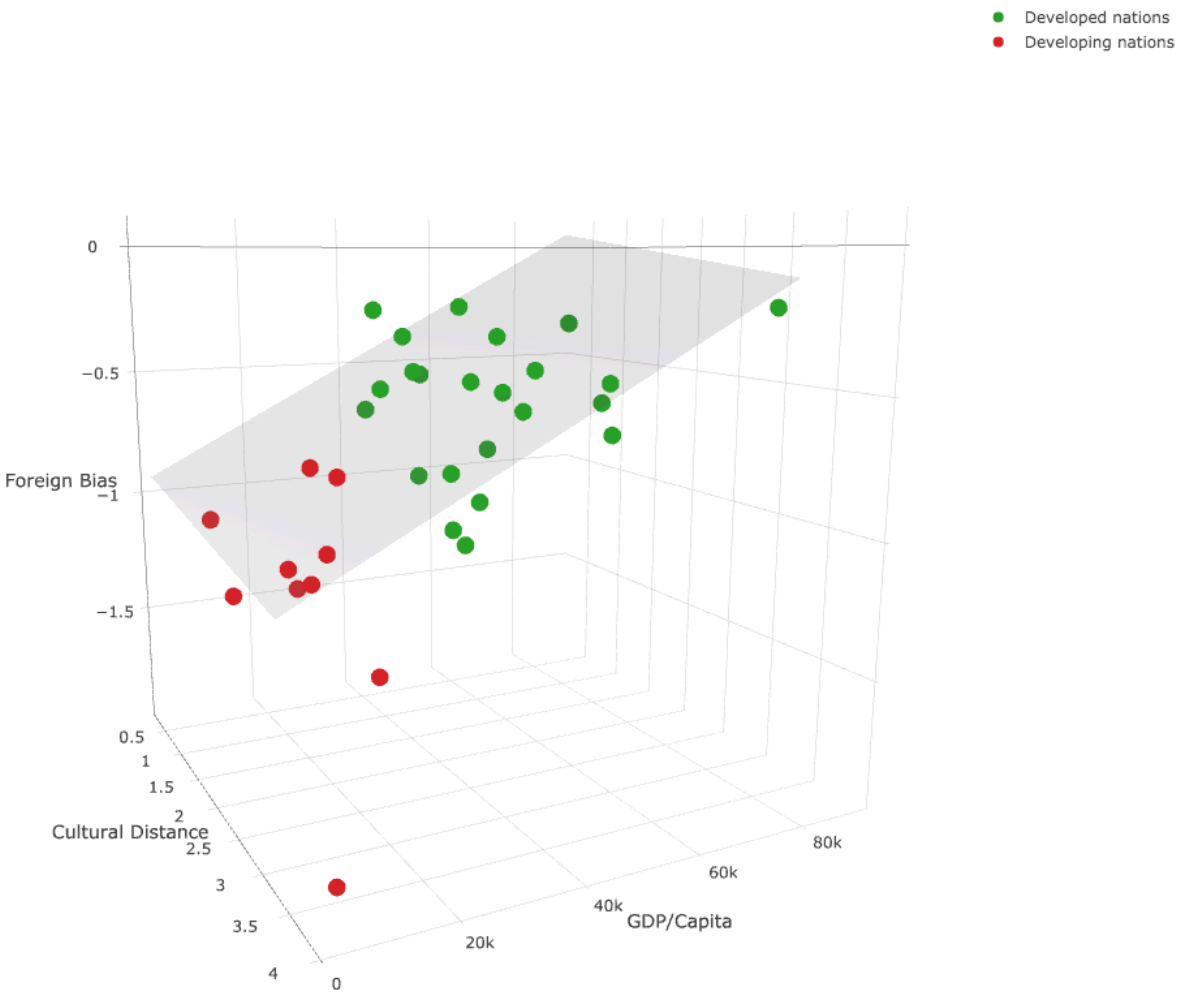
**Appendix L – Figure 3. Cultural distance and GDP/capita (population)**



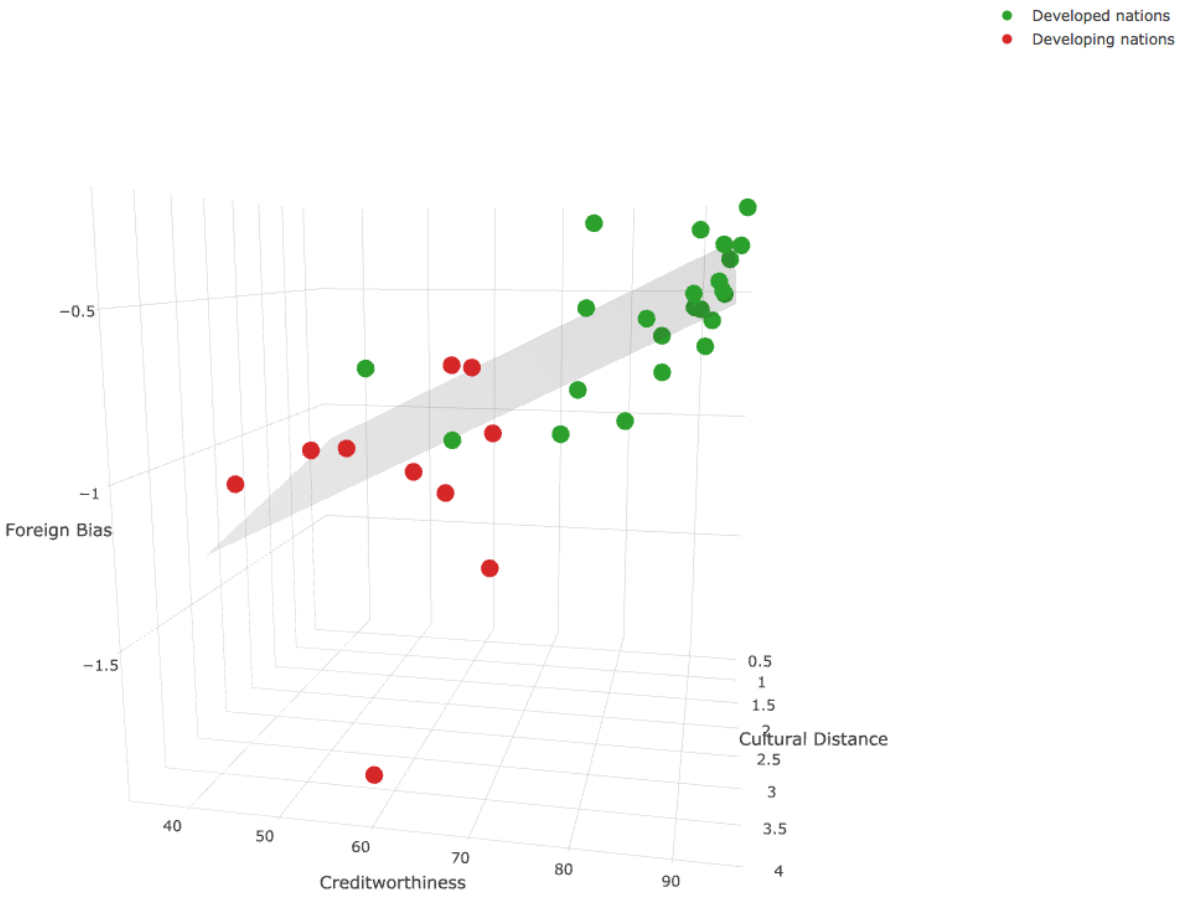
**Appendix M – Figure 4. Creditworthiness and GDP/capita (sample)**



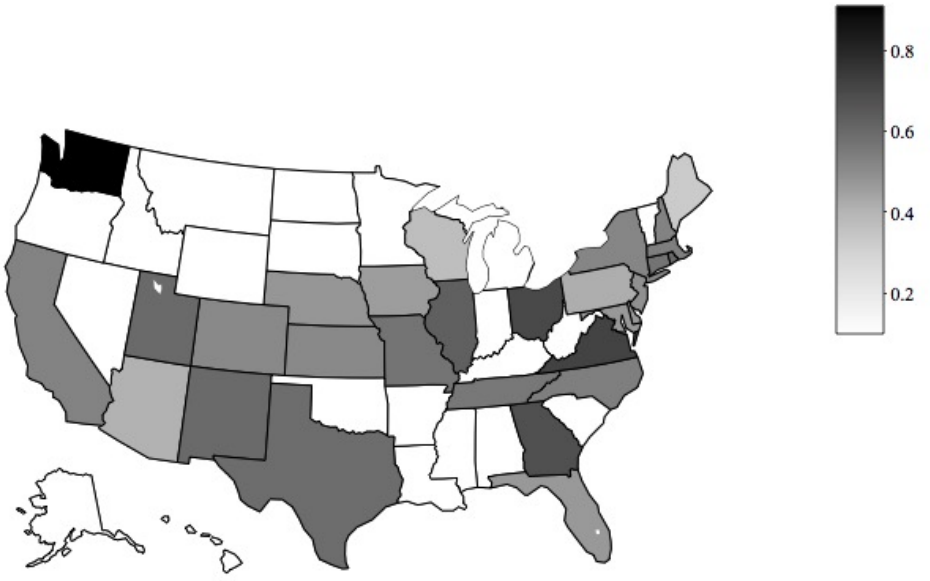
## Appendix N – Figure 5. Foreign Bias, Cultural distance, and GDP/Capita



## Appendix O – Figure 6. Foreign Bias, Cultural distance, and Creditworthiness



**Appendix P – Figure 7. Average level of religiosity by U.S. state for the sample (%)**



**Appendix Q – Figure 8. Average level of CP Ratio by U.S. state for the sample (%)**

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